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CASE HISTORIES

IN

PEDIATRICS.

A COLLECTION OF HISTORIES OF ACTUAL PATIENTS SELECTED TO ILLUSTRATE THE DIAGNOSIS, PROGNOSIS AND TREATMENT OF THE MOST IMPORTANT DISEASES OF INFANCY AND CHILDHOOD.

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TO

THOMAS MORGAN ROTCH, M.D.,

THE FATHER OF PEDIATRICS IN NEW ENGLAND,

THE ORGANIZER OF

THE DEPARTMENT OF PEDIATRICS

IN THE

HARVARD MEDICAL SCHOOL

AND THE

FOUNDER OF MODERN SCIENTIFIC INFANT FEEDING.

PREFACE.

THE author has found this method of case teaching so useful in the instruction not only of undergraduates but also of graduate students, who, although older and wiser than in their undergraduate days, are still students in the best and widest sense, that he felt that there was need for the utilization of this method for the presentation of the subject of pediatrics to the practitioner.

Case teaching, which had been in use for a number of years in the Harvard Law School, was introduced into the Harvard Medical School in 1900 at the suggestion of Prof. W. B. Cannon, then a student in the school. The author believes that this method of teaching is far superior to recitations, quizzes, and conferences. One of its greatest advantages is that it compels the student to think for himself. It is almost as valuable as the clinical lecture, in which the patient is shown, and, except in special instances, is more instructive than the didactic lecture. It is surpassed only by bedside instruction to small groups of students.

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SECTION I.

DISEASES OF THE NEW-BORN.

CASE 1. Sidney K. was the first child of healthy parents. There was no history of syphilis and there had been no miscarriages. He was born May 28, about a week premature. He weighed six pounds and was put at once on a weak modified milk. Jaundice developed on the second day and became very marked. He took his food well and had not vomited. The movements consisted at first of meconium; later the bowels were very constipated, but the movements were yellow and smooth. The temperature was normal or slightly subnormal. The urine had not stained the diapers. He was seen in consultation June 5, when eight days old.

Physical Examination. He was small and somewhat emaciated, having lost a pound. There was deep jaundice of the skin and conjunctivæ. He did not seem especially feeble. The fontanelle was level. The mouth and throat were normal. The heart, lungs and abdomen were normal. The umbilicus was healed. The liver was palpable 2 cm. below the costal border in the nipple line. The spleen was not palpable. The extremities were normal; there was no spasm or paralysis; the knee-jerks were equal and normal. The genitals were normal. There were no ulcerations about the anus. There was no eruption or enlargement of the peripheral lymph nodes. The rectal temperature was normal.

The urine was not examined, but the diapers were not stained by it.

The movements were small, constipated, brownish-yellow and well-digested.

Diagnosis. When jaundice develops during the first few days of life it is always a temptation to call it icterus neonatorum and to dismiss it without further consideration. There are other causes of jaundice at this age, however, and while a snap diagnosis of icterus neonatorum will be correct in the vast majority of cases, it will occasionally be wrong, and wrong often enough to justify a careful differential diagnosis in every instance. The diseases to be considered are, septic infection of the newborn, congenital obstruction or obliteration of the bile ducts, acute duodenal indigestion, congenital syphilis and congenital icterus.

The early appearance of the jaundice, the presence of deep

jaundice without cyanosis, the good general condition and the absence of fever and of enlargement of the liver and spleen rule out septic infection of the newborn. The absence of enlargement of the liver and spleen and of bile in the urine, together with the presence of bile in the stools, rule out congenital obliteration of the bile ducts. Acute duodenal indigestion is very uncommon at this age. It is excluded by the absence of bile in the urine and the presence of bile in the stools. Congenital syphilis is suggested by the prematurity. There are, however, other causes for prematurity than syphilis. The good family history and the absence of miscarriages are against it. The normal size of the liver and spleen, together with the absence of all signs of syphilis, rule it out. Congenital icterus is an extremely rare condition and is excluded because the jaundice was not present at birth and the spleen is not enlarged. The diagnosis by exclusion is, therefore, ICTERUS NEONATORUM. The development of the jaundice on the second day, the good general condition, the presence of bile in the stools, its absence in the urine, the normal temperature and the absence of enlargement of the liver and spleen are all consistent with this diagnosis.

Prognosis. Icterus neonatorum does not affect the general condition. The jaundice will probably not increase in intensity, but will not disappear entirely for several weeks.

Treatment. No treatment is indicated. Icterus neonatorum is a physiological condition and is due to the mere mechanical difficulty which the bile encounters in passing through the bile capillaries. There is, therefore, no object in giving cathartics. Cleaning out the intestine cannot affect the conditions in the bile capillaries. It has been shown that calomel, like the other so-called "cholagogues," does not increase the flow of bile. If it did, it would be contraindicated rather than indicated in this condition. There is no indication for changing the food, because sufficient bile to carry on digestion enters the intestine, only the excess passing into the circulation.

CASE 2. William P. was the second child of healthy parents. The position was O. D. P. He was delivered by high forceps and weighed eleven pounds. The physician in charge pulled very hard on one shoulder, probably the right, during the delivery, and thought that he felt something give way. The baby was somewhat white at birth, did not respond to artificial respiration, and mouth-to-mouth insufflation was necessary. He then cried and seemed perfectly normal except that it was noticed at once that there was some trouble with the face and the right arm. He did not close the right eye and there was no motion of the right side of the face. The right arm hung limp at the side and was used but little. There had been some improvement in the condition of both face and arm. He was seen in consultation when one week old. He was not nursed, but took the bottle well and had no disturbance of digestion.

Physical Examination. He was well-developed and nourished. His color was good. The fontanelle was 3 cm. in diameter and level. The head was of good shape. There was no rigidity of the neck. There was a hemorrhage into the right conjunctiva. The pupils were equal and reacted to light. The left eye could be closed entirely; the right only partially. The mouth was drawn to the left when he cried. There were forceps scars on the left forehead, but none on the right. The heart and lungs showed nothing abnormal. The level of the abdomen was that of the thorax. The cord was still on, but was healthy. The liver was palpable 3 cm. below the costal border in the nipple line; the spleen was not palpable. The genitals were normal. The right arm hung limply by the side, extended at the elbow and wrist, and with the palm turned backward. He made no active motions with this arm except at the wrist and with the fingers. His grip was strong. Passive motions were not limited. The arm was not tender, and there were no evidences of fracture or dislocation. The left arm and the legs were normal and showed no signs of spasm or paralysis. The knee-jerks were equal and lively. There was no Kernig's sign. There was no enlargement of the peripheral lymph nodes. The rectal temperature was normal.

Diagnosis. The diagnosis of facial paralysis is evident. The inability to close the eye shows that the upper branch of the facial is involved and that the paralysis is, therefore, peripheral in origin. It was undoubtedly caused by the pressure of the forceps blade on the trunk of the nerve. The hemorrhage into the right conjunctiva is presumably also due to injury from the forceps blade.

The flaccidity of the right arm at once rules out cerebral paralysis, in which the paralysis is spastic. Moreover, in cerebral paralysis due to injury at birth, the paralysis is never limited to one extremity, and if an extremity is affected,

FIG. 1. FACIAL TYPE. CASE 2.

FIG. 2. ARM TYPE. CASE 2.

it is always affected as a whole, not in part. If the baby was older, infantile paralysis (poliomyelitis) might be considered, but, as the paralysis was present at birth, is an impossibility. It corresponds perfectly to the so-called " obstetric paralysis " of the upper-arm type, in which there is a paralysis of certain muscles from injury to the brachial plexus during labor. The stretching of the plexus caused by the pulling on the shoulder was presumably the cause in this instance. The characteristic position of the arm is due to the fact that only certain muscles are involved, namely, the deltoid, biceps, brachialis anticus, supinator longus, infraspinatus, supraspinatus and serratus magnus.

This baby, therefore, shows both the facial and arm types of OBSTETRIC PARALYSIS.

Prognosis. The prognosis of the facial paralysis is almost absolutely good. Recovery almost invariably takes place in a few weeks.

The prognosis of the paralysis of the arm is not as good. There will certainly be a great deal of improvement, but equally certainly some permanent disability. How great this disability will be cannot be told for a year or two, after which time little improvement can be expected.

Treatment. The facial paralysis requires no treatment. The only treatment indicated for the arm at present is a sling to take the weight of the arm off the shoulder muscles. Massage and electricity may be begun in about three weeks. The object of them both is to keep up the tone of the muscles until the nerves regain their power. Faradism should be used, if the muscles react; if they do not, galvanism. If, at the end of a year, there has been but little improvement, operation on the nerve trunks is worthy of consideration.

CASE 3. Catherine E. was delivered at full-term by low forceps after a long labor, and weighed nine pounds. Her mother had been married twice. Her only pregnancy by her first husband had resulted in a miscarriage at two or three months, after an accident. She thought that he had not had syphilis and had had no symptoms of it herself. Her second husband denied having had syphilis. The patient was the first child by the second husband. She is said to have cried vigorously immediately after birth. The nurse noticed, a few hours later, however, that she did not breathe naturally. The trouble with the breathing continued. When quiet, she breathed quickly and her color was fair. If disturbed, or if she made any exertion, she usually became very cyanotic. Sometimes she at first became very pale and then cyanotic. She seldom cried. The respiration was never noisy. She usually kept her mouth shut and was able to suck. She had apparently never had any fever and had never had any disturbance of the digestion. She was seen in consultation when about five weeks old.

Physical Examination. She was fairly developed and nourished. When quiet, she breathed quickly but quietly. The alæ nasi did not move, she kept her mouth shut and her color was good. There was, however, moderate retraction of the epigastrium and of the sides of the chest. When disturbed, the respiration became more rapid and labored, but not noisy. She kept her mouth open and was evidently distressed. She tried to cry but was unable to make much noise. She became very cyanotic, and the retraction of the epigastrium and sides of the chest was much increased. A probe was easily passed through both nostrils. There were no snuffles. The throat was normal both to inspection and palpation and no adenoids were felt with the finger. There was no increase of the thymus dullness, and the thymus could not be felt in the suprasternal notch. The cardiac impulse was indistinctly palpable in the fourth left space $5\frac{1}{2}$ cm. to the left of the median line. The right border of dullness was 2 cm. to the right of the median line. The action was regular; the rate varied between 140 and 180 according to the difficulty in breathing. The sounds were normal in

character and there were no murmurs. There was marked dullness and diminished broncho-vesicular (much nearer vesicular than bronchial) respiration, with an occasional medium moist râle in the left front down to the cardiac area and in the upper left axilla, and over the whole right back except at the apex. There was hyperresonance and exaggerated vesicular respiration over the rest of the lungs, and numerous fine moist râles were heard. The abdomen was normal. The liver was palpable 2 cm. below the costal border in the nipple line; the spleen was not palpable. The extremities were normal. There was no spasm or paralysis. The knee-jerks were equal and normal. There was no enlargement of the peripheral lymph nodes. There was no eruption and no scars of any old eruption. There were no mucous patches about the anus. The rectal temperature was normal.

Diagnosis. The problem is to find the cause of the difficulty in respiration and cyanosis. This cause is the diagnosis. The physical examination rules out obstruction in the nose, nasopharynx, pharynx and larynx, as well as pressure from an enlarged thymus. The heart shows nothing abnormal. Sometimes, however, the examination of the heart shows nothing abnormal in congenital heart disease even when there are marked symptoms. The signs in the lungs are so definite in this instance, however, that it is not necessary to take refuge in this explanation. The signs in the lungs show partial solidification. The possible explanations of this solidification are resolving pneumonia, syphilis of the lung and congenital atelectasis.

Resolving pneumonia is mentioned merely because this was the diagnosis of another consultant. It can at once be ruled out because there was never any fever and the symptoms appeared within a few hours after birth. Syphilitic involvement of the lung sufficient to give such marked physical signs is very unusual and is found only in the severest cases in which there are many other signs of the disease. The negative family history and the lack of any other signs of syphilis rule it out in this instance. The early appearance and the persistence of the symptoms without fever are most

characteristic of atelectasis. The only point against it is that the baby is said to have cried vigorously at birth. This may have been an error of observation, but, if true, does not rule out atelectasis, because it is perfectly possible for a baby to cry loudly and yet not completely expand the lungs. The diagnosis is, therefore, CONGENITAL ATELECTASIS. The fine moist râles heard over the rest of the lungs are undoubtedly due to edema.

Prognosis. The prognosis is very grave. There is very little chance of expansion of the atelectatic areas after five weeks, and the child cannot live long in its present condition.

Treatment. There is no direct treatment for the atelectasis. The best that can be done is to feed the baby carefully, give it plenty of fresh air, administer oxygen when there is cyanosis, and stimulate it, if necessary.

CASE 4. Harriott H., the first child of healthy parents, was born at full-term after a difficult forceps delivery, and weighed eight pounds. She breathed at once and seemed normal in every way except that her head was much swollen and out of shape. The general swelling went down in twenty-four hours and then a circumscribed swelling was noticed on the right side of the head. This had diminished a little in size and had apparently caused her no discomfort. She had seemed normal in every way except for the swelling on the head. She was seen in consultation when a week old.

Physical Examination. She was well developed and nourished and of good color. There was a swelling, the size of a duck's egg, over the right parietal bone. This swelling was soft and fluctuating, but neither red nor tender. Pressure on it caused no bulging of the anterior fontanelle and no discomfort or signs of increased cerebral pressure. It did not extend beyond the borders of the right parietal bone. The pupils were equal and reacted to light. There was no rigidity of the neck. The anterior fontanelle was level. The heart, lungs and abdomen were normal. The liver was palpable 2 cm. below the costal border in the nipple line; the spleen was not palpable. The extremities were normal; there was no spasm or paralysis; the knee-jerks were equal and normal; there was no Kernig's sign.

Diagnosis. This tumor corresponds in every way to a CEPHALHEMATOMA and undoubtedly is one. The caput succedaneum is hard, does not fluctuate and is not limited to a single bone. It disappears in from twenty-four to forty-eight hours. The swelling first noticed in this instance was undoubtedly a caput. A meningocele protrudes through one of the normal openings in the skull, a fontanelle or suture, and is most often situated at the root of the nose or in the occipital region. Pressure on it causes bulging of the anterior fontanelle, discomfort and symptoms of increased cerebral pressure, such as spasm or twitching of the extremities. An abscess is hot, red and tender, and is accompanied by fever and symptoms of general constitutional disturbance.

Prognosis. The prognosis is absolutely good if the tumor is let alone. It is sure to disappear in from three to six weeks.

If it is aspirated or opened it may become infected and an abscess result.

Treatment. The treatment is to let it alone. External applications cannot hasten the absorption of the blood. Aspiration will hasten the disappearance of the tumor, but is unnecessary and carries with it the danger of infection. An incision is unnecessary, will leave a scar and is very likely to result in infection and the formation of an abscess.

FIG. 3. HARRIOTT H. CASE 4.

CASE 5. John B. was the first child of healthy parents, except that his mother had always been anemic. There had been no miscarriages. His father denied syphilis and showed no signs of having had it. There had never been any "bleeders" in either family. He was delivered at 6 A.M., August 4, at full term, by low forceps, after a short labor, and weighed nine pounds. He was normal except for a slight abrasion on the right cheek and another on the back of the neck, and breathed at once. He was put to the breast that afternoon, took hold well, but got nothing. The next morning he was ordered one-half ounce of a mixture containing 1% of fat, 5% of sugar, 0.25% of whey proteids and 0.25% of casein every two hours, but as this was vomited it was stopped after three feedings. Since then he had had only boiled water. Oozing of blood began about midnight, August 5, from both abrasions, and a hematoma, the size of half a walnut, appeared at the site of each of them. The oozing continued and he lost about half an ounce of blood during the night. The bleeding was then controlled by pads soaked in a 1-10,000 solution of adrenalin chloride. Several small hemorrhagic areas appeared in the roof of the mouth and one, the size of a dime, on the back that morning, August 6. He had not vomited blood or had any blood in his movements. The highest rectal temperature was 99° F. He had been given 10 ccm. of fresh rabbit's serum at 3.30 P.M., August 6. He was seen in consultation at 5 P.M.

Physical Examination. He was well developed and nourished, but moderately pale. The respiration was a little rapid. He seemed uncomfortable and was inclined to moan. The fontanelle was level. There was no rigidity of the neck. There were slight ecchymoses in the right eyelids. There were several ecchymotic areas, varying in size from that of a split pea to that of a twenty-five cent piece, on the upper part of the right cheek. There was an abrasion, about 2 cm. long and 1 cm. wide, over the largest ecchymosis, where there was also some swelling. It was scabbed over and not oozing. There was an ecchymotic area, the size of a twenty-five cent piece, on the back of the left neck, where there was also a scab, but no oozing. There was an ecchymotic area, the size

of a ten-cent piece, on the lower back, and half a dozen ecchymotic areas, the size of a pinhead or a little larger, in the roof of the mouth. The heart and lungs were normal. The abdomen was negative. There was no bleeding from the stump of the cord. The liver was palpable 3 cm. below the costal border in the nipple line; the spleen was not palpable. The extremities were normal; there was no spasm or paralysis; the knee-jerks were equal and normal; Kernig's sign was absent. There was no enlargement of the peripheral lymph nodes. There was no bleeding from the point where the rabbit's serum was injected.

The movements which were seen were loose, dark-green and contained considerable mucus, but no blood.

Diagnosis. The diseases to be considered here are congenital syphilis, hemophilia and hemorrhagic disease of the newborn. Syphilis can be excluded on the negative family history, the absence of miscarriages, the good general condition, the absence of all signs of syphilis, such as enlargement of the liver and spleen and eruptions, and the fact that hemorrhage occurs only in the severest cases which show many other signs of the disease. Hemophilia can be excluded on the family history and the fact that the tendency to bleed in hemophilia almost never appears before the end of the first year. Larrabee, writing in 1906, was able to collect but thirty-six cases of hemorrhage in the newborn due to hemophilia, and in all but two of these there was a family history of the disease. The diagnosis is, therefore, HEMORRHAGIC DISEASE OF THE NEW-BORN.

Prognosis. The condition is, in general, a very serious one. Sixty per cent, or more, of the patients die, one half of them in the first twenty-four hours after the onset of the bleeding. If they survive a week they almost invariably recover. The symptoms cease in the first five days in two thirds of the cases that recover. The cases in which there is hemorrhage from the gastro-intestinal tract and in which there is a high temperature are more serious than those in which there is no gastro-intestinal hemorrhage and in which the temperature is low.

The following prognosis seems justified in this instance.

The baby has a very serious disease. It is impossible to say whether or not the hemorrhages will recur or others appear. The outlook is, however, fairly good because he has already lived seventeen hours, there has been no hemorrhage for several hours, the bleeding is all external where it can be reached, and the temperature is normal. Every day that he lives increases his chances materially. There is no reason to fear recurrence in after years because this is a self-limited condition and not the disease hemophilia.

Treatment. It is very difficult to know just how to treat the condition known as hemorrhagic disease of the newborn, because it is probably not a definite disease, but merely a combination of symptoms due to a variety of causes, the most common of which is presumably sepsis. The only definite point in the pathology is that the blood coagulates very slowly, or not at all. It is very probable, too, that the delay in the coagulation is due to the lack of something in the blood and not to the presence of some inhibitory substance.

Most of the methods employed in the past in the treatment of this disease have recently been proved to be useless. Ergot and iron cannot, of course, have any effect in increasing the coagulability of the blood. Adrenalin has practically no action unless given intravenously. Its action is then general and not local, and the increase of the blood pressure would tend to increase rather than to diminish the bleeding. Gelatine does not increase the coagulability of the blood either *in vitro* or *in viro*. There is no lack of calcium salts in the blood in these cases and, therefore, the administration of calcium salts can do no good.

A more rational treatment is the subcutaneous injection of fresh animal serum, preferably rabbit's, which contains all the ferments of the blood. Theoretically it would seem as if this could not do any good, because the blood contains antiferment enough to much more than neutralize the ferment contained in the ordinary doses of serum before it can be utilized in coagulation. Practically, it has seemed very useful in a considerable number of cases.

The most rational method of treatment is transfusion, which not only replaces the lost blood but stops the hemor-

rhage by supplying new material for the production of the fibrin ferment. It has proved most satisfactory in the few cases in which it has been used. Before performing transfusion, however, it is necessary to be sure that the donor's blood does not produce hemolysis. Transfusion is a serious operation for both parties, and should not be undertaken lightly but only as a last resort. It must not on this account, however, be delayed too long.

This baby has already had an injection of rabbit's serum. If the hemorrhage recurs, it should be repeated in six or eight hours and again at the same interval, if necessary. If the serum fails to restrain the hemorrhage in these doses, or if at any time the baby's condition is becoming at all critical, transfusion should be done. The preferable donor is the father.

Locally, the adrenalin solution should be continued in connection with pressure. If this fails to stop the bleeding, the strength of the solution may be increased to 1-1,000, or the dry powder used. If this is not effective, Monsel's salt and pressure may be tried.

The baby should be given one to two teaspoonfuls of a mixture of one part of breast milk to three parts of water, or whey, every hour.

CASE 6. Baby G. was born at full term after a normal labor. He seemed healthy at birth but was not carefully examined. He was taken care of by a woman ignorant of the ordinary rules of cleanliness. The cord came off on the seventh day. The navel was healthy and at no time, before or after, was there any redness or inflammation about it. He was breast-fed and did very well until he was five days old, when he began to vomit a little and act as if he had pain in the abdomen. The vomiting and pain continued and increased in severity. He also began to have two or three loose yellow movements, containing fine curds and having a foul odor, daily. When he was nine days old a swelling, which seemed tender, was noticed in the epigastrium. The swelling in the epigastrium increased and by the twelfth day the whole abdomen was distended. He had apparently begun to have fever on the eighth day, but the temperature had not been taken. He was seen in consultation when two weeks old.

Physical Examination. He had evidently lost much weight and his color was pasty. His face bore an expression of suffering. The fontanelle was depressed. There was no rigidity of the neck. The pupils were equal and reacted to light. The tongue was dry and covered with a brownish coat. The heart and lungs were normal. The upper border of the liver flatness in the nipple line was at the fourth rib; the lower border was not palpable. The spleen was not palpable. The navel was healthy and there was no redness about it. The abdomen was generally considerably distended, but distinctly more so in the epigastrium. It was everywhere tympanitic, except over an area, the size of a silver dollar, in the median line midway between the tip of the ensiform and the navel. There was a marked sense of resistance in and about this area, but no definite muscular spasm. Tenderness was general throughout the abdomen, but much more marked over the resistant area in the epigastrium. There was no dullness in the flanks and no fluid wave. The legs were drawn up on the abdomen and extension caused additional pain. It was impossible to determine the presence or absence of the knee-jerks or Kernig's sign

because of the baby's resistance. There was no enlargement of the peripheral lymph nodes. The rectal temperature was 104° F., the pulse 160, the respiration 60.

Diagnosis. The trouble is undoubtedly located in the abdomen. The liver is displaced upward. The fact that the baby is breast-fed and the mildness of the symptoms of indigestion in comparison with the high temperature, poor general condition and marked local symptoms show that the trouble is outside the gastro-intestinal tract. The situation of the local symptoms and the age of the baby make appendicitis very improbable. The two possibilities are an inflammatory process, probably a localized abscess in the epigastrium, or a general peritonitis. The localization of the physical signs in the epigastrium and the absence of general muscular spasm and free fluid in the abdomen are much against general peritonitis and in favor of a localized abscess. A white count was not made because it could not help in the diagnosis, since both conditions are associated with leucocytosis. An inflammatory process in the upper or middle abdomen at this age is almost invariably due to infection through the navel. The navel in this instance shows no signs of inflammation at present, and has shown none in the past. This does not rule out infection through the navel, however, as it is not uncommon for this to occur without causing any local manifestations. The known ignorance and the uncleanliness of the woman who took care of the baby make an infection through the navel seem even more likely. The most reasonable diagnosis is, therefore, a localized inflammatory process, probably an abscess, in the epigastrium, as the result of an infection through the navel, i. e., a SEPTIC INFECTION OF THE NEW-BORN.

Prognosis. The prognosis is hopeless without an operation, practically hopeless with one.

Treatment. The only treatment which offers any chance of recovery is an immediate laparotomy.

CASE 7. Martha R., the third child of healthy parents, was born at full term after a normal labor and was apparently normal at birth. She was seen when three and a half months old. She was breast-fed entirely for two weeks, given one part of whole milk and two parts of water in addition for two months, then milk and water alone. Her weight at birth was not known, but she had evidently gained a little. The movements had been whitish in color from the first. Jaundice was first noticed when she was ten or twelve days old and had persisted, with a certain amount of increase, ever since. It was thought that the urine was light-colored in the beginning, but that it very soon became greenish and had so continued. The abdomen was large at birth and had so remained. The baby had seemed fairly well on the whole, but had vomited occasionally and had had two loose white movements daily. It was thought that she had had a little fever from time to time.

Physical Examination. She was fairly developed and nourished. There was marked jaundice of the skin, mucous membranes and conjunctivæ. The anterior fontanelle was 4 cm. in diameter and level. She was perfectly intelligent. The mouth and throat were normal, and there were no snuffles. There was no rosary. The heart and lungs were normal. The upper border of the liver flatness was at the upper border of the fifth rib in the nipple line. The lower border of the liver was palpable, running from the right anterior superior spine to the left costal border in the nipple line. The notch was indistinctly palpable in the median line; the edge was a little rounded, the surface smooth. The gall bladder was not felt. The spleen was palpable, running out from beneath the costal border in the anterior axillary line, downward to the level of the navel, and backward and upward under the ribs in the posterior axillary line. It extended 4 cm. below the costal border and was 6 cm. wide. There was a moderate-sized umbilical hernia. There were no signs of fluid in the abdomen and no other masses were felt. The abdomen was not distended, except by the enlarged liver and spleen. Rectal examination was negative. The cervical lymph nodes were slightly enlarged; the axillary and inguinal were not.

There was a slight intertrigo about the buttocks and genitals, but no lesions of scratching. There were no mucous patches and no scars of any old eruption. The extremities were normal. The weight was nine pounds.

The urine was greenish in color, of a specific gravity of 1,009, and acid in reaction. It contained no albumin but considerable bile.

The stools were somewhat loose, grayish-white in color, foul in odor. Examination by the corrosive sublimate test showed a total absence of bile.

Diagnosis. The history, physical examination, urine and stools together present such a characteristic picture of CONGENITAL OBLITERATION OF THE BILE DUCTS that a differential diagnosis is hardly necessary. The only other things to be considered as possibilities are congenital syphilis and duodenal indigestion. Enlargement of the liver and spleen, sometimes accompanied by jaundice, do occur in congenital syphilis. The absence of bile in the stools and of other signs of syphilis, such as snuffles, mucous patches and the scars of old eruptions, exclude it in this instance. Duodenal indigestion is extremely unusual at this age, the liver but little enlarged, the spleen not at all. It can, therefore, also be ruled out. An important point to be remembered in this connection is the fact that there is a colorless form of bile, leucohydrobilirubin. It is never safe, therefore, to conclude absolutely, without a chemical test, that a stool does not contain bile, even if it is white or clay-colored.

Prognosis. The prognosis is absolutely hopeless. No case has lived to be more than eight months old. Death occurs from debility, secondary hemorrhage or intercurrent disease.

Treatment. There is no curative treatment. The patients probably live longer and certainly digest better and are more comfortable, however, if fat is eliminated from their food.

CASE 8. Robert R., the first child of healthy parents, had always been very well. He had been entirely breast-fed, had never had a cough and had not cried more than a normal baby should. When he was about three months old his mother noticed a bunch in the right groin. She had not seen it before, but could not say whether it had been there before or not. She thought that it had increased a little in size since she first discovered it. It apparently caused the baby no discomfort. He was seen in consultation a week after the discovery of the tumor.

Physical Examination. He was in splendid general condition, large, fat and of good color. The fontanelle was level. There was no rosary. The heart, lungs and abdomen were normal. The liver was palpable 2 cm. below the costal border in the nipple line; the spleen was not palpable. The extremities were normal. There was no spasm or paralysis; the knee-jerks were equal and normal; there was no Kernig's sign. There was no enlargement of the peripheral lymph nodes.

There was a slightly elastic swelling, about the size and shape of a catbird's egg, in the right inguinal region just above the entrance to the scrotum. It was not tender, hot or red. It could be pushed upward and downward en masse, but could not be pushed into either the abdomen or the scrotum. It did not gurgle. The inguinal rings felt alike on both sides, and nothing could be felt in them. Both testicles were in the scrotum.

Diagnosis. The history is unimportant in this instance. Babies often develop an inguinal hernia without cough or excessive crying and the mother does not know whether the swelling was present at birth or appeared later. The diagnosis must be made entirely on the physical examination. A partially descended testicle can be ruled out because both testicles are in the scrotum. The elasticity rules out a hyperplastic lymph node. It is, moreover, very unusual to find only one enlarged lymph node in the groin, and a large lymph node is seldom so movable. The normal condition of the inguinal ring rules out hernia. The absence of gurgling and the irreducibility of the mass are corroborative evidence

against hernia. The shape, elasticity, mobility and irreducibility are characteristic of an ENCYSTED HYDROCELE OF THE CORD, which is the diagnosis.

Prognosis. There is, of course, nothing dangerous about this condition. A single tapping usually cures it.

Treatment. The treatment is aspiration with a fine needle. One tapping will probably cure it. If it does not, the tapping may be repeated. An operation will almost certainly not be necessary.

CASE 9. Roger S. was seen in consultation when three months old. He was the fifth child and was born at full term after a normal vertex labor. He was perfectly normal at birth, but when he was two days old it was noticed that he had some difficulty in breathing. This difficulty gradually increased for about three weeks, since when it had remained about the same. Inspiration was always noisy, whether he was awake or asleep. It was noisier when he was excited and when he was lying down, especially if he lay on his face. Expiration was quiet. He never became blue and never held his breath. His cry was always clear and he almost never coughed. He had at times a little difficulty in taking food. He was partly breast- and partly bottle-fed. His digestion had always been perfect and he had gained steadily in weight.

Physical Examination. He was well developed and nourished, but a little flabby. He was somewhat pale, but not at all cyanotic. Inspiration was always accompanied by a crowing sound, which was more marked when he was frightened or excited. This noise was louder when he was lying down than when he was sitting up. He seemed uncomfortable when lying on his face. Expiration was perfectly quiet. His mouth was usually open, but the crowing sound was no louder and respiration was no more difficult when it was closed. His cry was perfectly clear. There was slight retraction of the epigastrium with almost every inspiration. This was more marked and was accompanied by marked retraction of the suprasternal and supraclavicular spaces when the crowing was louder. He was not at all cyanotic even when the crowing sound was the loudest. The anterior fontanelle was 4 cm. in diameter and level. The shape of the head was good. There was no craniotabes. The fauces, pharynx and nasopharynx showed nothing abnormal on either inspection or palpation. The thymic dullness was not increased and the thymus could not be felt in the suprasternal notch. The heart and lungs were normal. The chest was slightly flattened on the sides and the sternum was a little prominent. There was a moderate rosary. The abdomen was rather large, but otherwise normal. The lower border of

the liver was palpable 2 cm. below the costal border in the nipple line; the spleen was not palpable. The extremities showed nothing abnormal. There was no spasm or paralysis. The knee-jerks were equal, but not very lively. Kernig's sign was absent. There was no enlargement of the peripheral lymph nodes. Trousseau's sign and the facial phenomenon were absent.

Diagnosis. Laryngismus stridulus can be excluded at once because the crowing sound is continuous. Other less important points against laryngismus stridulus are the early onset and the absence of other signs of increased nervous irritability (Trousseau's sign, facial phenomenon, exaggerated reflexes). Obstruction in the nose, nasopharynx and pharynx is excluded by the physical examination. Obstruction from pressure on the trachea by enlarged bronchial glands, new growths in the mediastinum or an enlarged thymus is excluded by the fact that the interference is entirely with inspiration. The sound resulting from obstruction in this locality is, moreover, not crowing in character. It cannot be due to obstruction within the larynx from inflammation or new growths, because the cry is clear and there is no cough. The obstruction must be, therefore, at the entrance of the larynx. The anatomical malformation which can produce this obstruction is a narrowing of the epiglottis with laxness of the ary-epiglottidean folds. This condition was found by laryngoscopic examination in this patient. The result of this condition, noisy inspiration, is known as CONGENITAL LARYNGEAL STRIDOR.

Prognosis. The prognosis is good, both as to life and recovery. The deformity disappears with the growth of the parts and the crowing gradually diminishes and finally ceases toward the end of the second year.

Treatment. Nothing can be done to hasten the growth of the parts. It is important, however, to avoid, as far as possible, catarrhal processes in the respiratory tract.

SECTION II.

DISEASES OF THE GASTRO-ENTERIC TRACT.

The classification which follows is a slight modification of that adopted by the Department of Pediatrics of the Harvard Medical School, and, while open to many objections, seems to the author more satisfactory than any other. It is given in order that the terms used later may be intelligible.

The author is in the habit of roughly dividing the diseases of the gastro-enteric tract, associated with diarrhea, in the following manner. He realizes that this division is arbitrary and open to much criticism, but it seems to him reasonably satisfactory from a clinical standpoint and as a basis for treatment.

When there is merely an increase in the number of movements, with a diminution in the consistency, no fever and practically no other symptoms, he describes the condition as nervous diarrhea and attributes it to causes acting directly or indirectly on the central nervous system.

Under normal conditions there is an equilibrium between the work to be done and the power to do it, that is, between the food which is to be digested by the intestinal secretions and the secretions. If there is a disturbance of this equilibrium, either from an increase in the amount of work to be done, as occurs when the amount or strength of the food is too great, or from a diminution in the amount or digestive power of the secretions, as occurs when the child is depressed from any cause or is suffering from some other disease, the condition designated as intestinal indigestion due to disturbance of equilibrium develops. This condition may be either acute or chronic. Bacteria play no part in its etiology. The stools are increased in number and, as a rule, diminished in consistency, but usually not changed in color. They also show evidences of incomplete digestion

of the food. Under this head are included those disturbances due to an excess of one or more elements of the food, fat, carbohydrates or proteids, as the case may be. The character of the stools in such instances naturally varies according to what element or elements of the food are in excess. The term, malnutrition resulting from an excess of fat, carbohydrates or proteids in the food, describes the condition more satisfactorily, perhaps, than does that of chronic intestinal indigestion.

If fermentation or decomposition takes place in the intestinal contents as the result of bacterial action, new symptoms develop. The stools are usually changed in color and odor and show more marked disturbance of digestion. Other symptoms, such as fever, may appear as the result of toxic absorption. This is the class of cases known as intestinal indigestion of the fermentative type. It is more often acute than chronic. It is assumed that in pure cases there is no inflammation of the intestine and no entrance of bacteria into the circulation.

If the bacteria cause inflammatory changes in the intestinal wall there is usually a further change in the character of the stools, which become very numerous and are composed mainly of mucus and blood. The temperature is usually moderately and constantly elevated, and the constitutional symptoms are much more marked. It is probable that in many instances bacteria traverse the intestinal wall and enter the circulation. This condition is called infectious diarrhea of the dysenteric type.

Cholera infantum, in which there is a very large number of profuse watery movements, is presumably a variety of infectious diarrhea.

Since the diagnosis between the various diseases of the gastro-enteric tract is of relatively more importance than that between these and other diseases, the cases illustrative of them are given together and follow.

GASTRIC.

- Developmental
  - Malpositions.
  - Malformations — Pyloric stenosis.
- Non-Infectious
  - Functional.
    - Nervous vomiting.
    - Recurrent vomiting.
    - Indigestion { Acute. / Chronic.
  - Mechanical.
    - Contraction.
    - Dilatation.
  - Ulcers — peptic.
  - New growths.
  - Gastritis — corrosive.
- Infectious
  - Gastritis.

ENTERIC.

- Developmental
  - Malpositions.
  - Malformations.
- Non-Infectious
  - Mechanical.
    - Dilatation of colon.
    - Volvulus.
    - Intussusception.
    - Hernia.
    - Fissure.
    - Prolapse.
    - Polypi.
    - Hemorrhoids.
  - New growths.
  - Functional.
    - Incontinence.
    - Constipation { Atonic. / Spasmodic. / Mechanical.
    - Nervous diarrhea.
    - Indigestion
      - Duodenal { Acute. / Chronic.
      - Intestinal { Disturbance of equilibrium { Acute. / Chronic. / Fermentation.
- Infectious
  - Proctitis.
  - Appendicitis.
  - Fistulæ.
  - Infectious diarrhea { Dysenteric type. / Cholera infantum.

ANIMAL PARASITES.

CASE 10. Robert M., the second child of healthy parents, was born at full term after a normal labor. He was normal at birth and weighed six pounds and twelve ounces. His mother had a plentiful supply of milk and he was nursed regularly at two-hour intervals. He vomited a little from the first, but when two weeks old began to vomit much more. This was at first attributed to indiscretions in diet on his mother's part, but continued to increase after her diet was carefully regulated. It was then thought that he got too much milk, and the length of nursing was shortened to five minutes. This made no difference in the vomiting. A half-teaspoonful of lime water was then given with each nursing, but did not affect the vomiting. The mother was a healthy, vigorous woman, and it did not seem probable that the composition of the breast-milk was at fault, although it had not been examined. Whey, which was tried for twenty-four hours, was vomited more than the breast-milk. The vomiting sometimes occurred immediately after nursing, but usually not for an hour or more. Sometimes several feedings were retained and then vomited together. The vomiting had recently been explosive. The bowels had moved regularly, but the movements had been small; they were dark green in color and composed largely of mucus with a few fine curds. He acted hungry all the time and cried a great deal, apparently from hunger. He gained slowly in weight during the first three weeks up to seven pounds and twelve ounces. When seen in consultation, when five weeks old, he had dropped back to seven pounds and four ounces.

Physical Examination. He was well developed and nourished and of good color. The fontanelle was level, and the bones of the skull did not overlap. His tongue was clean and moist. The heart and lungs were normal. The liver was palpable 1 cm. below the costal border in the nipple line. The spleen was not palpable. The extremities were normal. There was no spasm or paralysis; the knee-jerks were equal and normal. There was no enlargement of the peripheral lymph nodes. The examination of the abdomen was at first rather difficult because of the crying, and nothing abnormal was detected. The stomach was undoubtedly empty, as he

had vomited a great deal about an hour before and had taken nothing since. It was thought that he would keep quieter if his stomach was filled and that perhaps something might be seen or felt then which could not be before. He was, therefore, given two and one-half ounces of water, which he took greedily. The lower border of the stomach then reached to the navel, and very marked waves of peristalsis, running from left to right, appeared. A mass about the size of a marble was felt indistinctly in the region of the pylorus. He then vomited the whole of the water in one gush, the water striking the floor about three feet from the baby. The tumor could then be felt very distinctly while the baby was relaxed after the vomiting. He had a small movement, consisting of about half a teaspoonful of brownish mucus, during the examination.

Diagnosis. The history in this instance is so typical of INFANTILE PYLORIC STENOSIS that it justifies, as far as any history without physical examination can, a positive diagnosis of this condition. The only other disease to be seriously considered is chronic gastric indigestion. The appearance of vomiting in a breast-fed baby after two weeks, in which there had been only a little spitting up, the progressive increase of the vomiting, the failure to respond to regulation of the nursing, the explosive character of the vomiting and the small meconium-like stools containing almost no fecal residue, are not consistent with chronic gastric indigestion. A cerebral lesion as the cause of the vomiting can be immediately ruled out on the general condition, the level fontanelle and the absence of spasm, paralysis and increased reflexes.

The physical examination verifies, of course, the diagnosis made on the history. The enlargement of the stomach, the visible peristalsis and the palpable tumor are proof positive. The methods employed in the examination of the abdomen are worthy of attention. No examination of the abdomen can be considered complete, when there is a suspicion of stenosis of the pylorus, unless it is made with the stomach both full and empty. If peristalsis is not visible when the stomach is full, it can often be produced by stroking the epigastrium or flicking it with a towel wet in cold water, or a piece of ice. The author believes that a positive diagnosis of

pyloric stenosis would have been justified in this case even if a tumor had not been felt.

Prognosis. The prognosis without operation is hopeless; with an operation by a competent surgeon the outlook is very good, because of the baby's good general condition. The operations for this condition are all so recent that there are almost no data as to what happens to these babies in after years. What data there are, however, go to show that their digestive powers are not impaired, that they develop normally and that their expectation of life is not altered.

Treatment. The only rational treatment in this instance is immediate operation. The best operation is a posterior gastro-enterostomy. It is a delicate operation, requiring special skill. Slight variations in technic make the difference between success and failure, life and death. No surgeon who has not done it before, or who has not had much experience in operating on small animals, should attempt it.

CASE 11. Mary M., three and a half years old, was in the habit of having occasional attacks of vomiting, which were usually of short duration. She was a well and vigorous but nervous child. She was carefully fed. July 1 she ate an unusually hearty supper of proper food at six o'clock and then played very hard and was a good deal excited for about half an hour. She went to bed soon after and quickly dropped to sleep. She woke up and began to vomit at 9 P.M. The vomiting continued and finally there was much retching without vomiting. The vomitus at first consisted of the food taken at supper, later of nothing but mucus. She was seen at 11.30 P.M.

Physical Examination. She was well developed and nourished and did not look or act ill. Her tongue was nearly clean. The level of the abdomen was that of the thorax. There was no muscular spasm or tenderness. The rest of a careful physical examination showed nothing abnormal. The rectal temperature was 98.6° F.

Diagnosis. The absence of physical signs and the normal temperature rule out at once all diseases outside of the digestive tract. The only diseases of this tract to be considered are nervous vomiting, acute gastric indigestion and the onset of recurrent vomiting.

It is impossible to absolutely exclude recurrent vomiting at this time, only two and a half hours after the onset, but the history of similar attacks in the past, all of short duration, makes it very improbable. The differentiation between nervous vomiting and acute gastric indigestion is a rather difficult and uncertain one, as the line between the two forms is not very sharp. The absence of temperature and the practically normal condition of the tongue are against indigestion. The fact that the vomiting developed after a meal of proper food followed by undue exertion and excitement point strongly to a nervous disturbance. The over-exertion and excitement presumably inhibited digestion, and the undigested food acted like a foreign body in the stomach and brought on the vomiting by reflex action. The diagnosis is, therefore, NERVOUS VOMITING.

Prognosis. The prognosis as to life is, of course, good. The stomach having been thoroughly emptied, as shown by

the character of the last vomitus, the vomiting ought to stop in a few hours or less, if nothing is done in the way of medication to keep it up.

Treatment. Quiet and frequent sips of a solution of bicarbonate of soda, fifteen grains to a glass of water, are all that is necessary. A mild laxative, such as two teaspoonfuls of milk of magnesia, in the morning, to hurry along any undigested food which may have passed into the intestine is advisable. Broth and toast for breakfast, and a rather light diet and quiet for the rest of the next day, complete the treatment.

CASE 12. Rosamond B. was seven and a half years old. Her mother had valvular heart disease and was markedly neurotic. Her mother's family was extremely neurotic and several members had been insane. Her father's family was rheumatic.

She was a decidedly neurotic child and was very fussy about her diet, and had also been fed very carefully because of the rheumatic family history. Her appetite was very good. She had had no symptoms of indigestion except that her bowels were always constipated. She had been taking cascara regularly for more than a year.

She had had no unusual excitement, had not exerted herself unduly, and had done nothing unusual during November 28. She began to vomit at 5 A.M., November 29. She vomited every few minutes during that day and night and about every two hours during the 30th up to 9 P.M., when she was seen in consultation. In all, she vomited fifty-two times during this period. The vomiting was not explosive. The vomitus at first contained a little of the food taken at supper, but after this consisted of water mixed with a little mucus. It did not contain bile. She had taken nothing by mouth except water in small quantities and cracked ice, which had been given because of the extreme thirst. Both had been vomited immediately. The bowels had been moved freely by enemata. The stools were normal in character. Her temperature, taken in the axilla, had ranged between 99° F. and 100° F. She had been rather restless and had slept but little. Bromide, given by enema, had quieted her considerably. She had had no pain.

Physical Examination. She was tall and slight. Her color was good. The pupils were equal and reacted to both light and accommodation. There was no rigidity of the neck. She was perfectly clear mentally. Her tongue was moist and but slightly coated. Her breath had a slightly sweetish odor. The heart, lungs and liver were normal. The level of the abdomen was that of the thorax. There was no muscular spasm and no tenderness. Palpation was easy and disclosed nothing abnormal. The spleen was not palpable; the area of dullness was normal. The extremities showed nothing

abnormal. There was no spasm or paralysis. The knee-jerks were equal and lively. Kernig's and Babinski's signs were both absent. The cervical and axillary lymph nodes were somewhat enlarged; the inguinal were not. The rectal temperature was 99° F., the pulse 96, the respiration 20. She did not object to the examination, but gave the impression that she was decidedly neurotic.

The urine contained neither albumin nor sugar, but gave the tests for both acetone and diacetic acid.

Diagnosis. The conditions which may be reasonably considered in this instance are meningitis, more likely tubercular than cerebrospinal, intestinal obstruction, nervous vomiting and recurrent vomiting.

Meningitis can be at once excluded on the combination of the absence of all signs of meningeal irritation, the low temperature and the excessive amount of the vomiting compared with the other symptoms. It can be so positively excluded that lumbar puncture is not justified as a method of diagnosis, although this ought to be done in every case in which there is a reasonable chance of meningitis because of the good which can be accomplished by the serum treatment in cerebrospinal meningitis, especially when the diagnosis is made early.

Intestinal obstruction can also be excluded on the character of the vomitus, the absence of physical signs in the abdomen, the clean tongue, the free movements from the bowels, the low temperature and the good general condition.

The neurotic family history and the neurotic disposition of the patient are consistent with either nervous or recurrent vomiting. So are the character of the vomitus, the absence of physical signs, the clean tongue, the low temperature and the good general condition. The excessive amount of the vomiting and the absence of any cause for nervous vomiting make this diagnosis very improbable. In fact, the whole picture is characteristic of what is known as RECURRENT VOMITING. It may be said that it is incorrect to call the condition "recurrent vomiting" when the child has never had anything like it before. It must be remembered in this connection, however, that there is always a first time for everything. Since acid intoxication is probably one of the

causes of recurrent vomiting, the sweet odor of the breath and the presence of acetone and diacetic acid in the urine might be thought indicative of this condition as against nervous vomiting. This is not so, however, as the abstinence from food for thirty-six hours will account for them equally well.

Prognosis. There is no danger as to life. The vomiting will probably not persist more than forty-eight hours longer, more likely a shorter than a longer time. The duration will depend somewhat on whether the treatment is rational or not.

Treatment. Before taking up the treatment it must be remembered that recurrent vomiting is probably merely a symptom-complex of manifold etiology. In most instances it is a manifestation of some disturbance of metabolism. This disturbance is sometimes an intoxication from the acetone bodies (the so-called acid intoxication) and sometimes an intoxication from uric acid. Most often the nature of the disturbance is unknown. In some instances it is a manifestation of inflammation of the appendix. In this instance appendicitis can be immediately ruled out on the absence of all signs of inflammation in this region. It is impossible to state, however, what the nature of the disturbance of metabolism is. The sweet breath and the presence of acetone bodies in the urine suggest acid intoxication. They do not prove it, however, because starvation will also account for them. It is reasonable, however, to treat the condition on this basis. Such treatment can do no harm if it does no good.

This treatment consists in the administration of bicarbonate of soda. From one-half ounce to an ounce should be given in twenty-four hours. The attempt should be made to give it by mouth in teaspoonful or tablespoonful doses of a solution of bicarbonate of soda, one teaspoonful to a glass of water, every fifteen to thirty minutes. It is well to persist, even if the soda is vomited. High enemata of a solution of bicarbonate of soda, two drams to six ounces of water, should be given every four hours. The child should be kept perfectly quiet, in a cool, dark room. No food should be given by mouth. It will probably be necessary on account of the excessive thirst to give small amounts of liquid, even if vom-

ited. Water or carbonated water, in doses of from one teaspoonful to one tablespoonful, or cracked ice, may be given. If she is restless or sleepless from vomiting, ten or fifteen grains of bromide of soda may be given in the enemata of bicarbonate of soda. If this is not effective, morphia, gr. $\frac{1}{16}$, may be given subcutaneously. Food should not be given until twelve hours after the vomiting has stopped. Whey, cereal waters, or cereal waters with sugar, should then be given, beginning with an ounce every hour and increasing the amount if they are retained. These foods are given instead of broths or albumin water because the carbohydrates antagonize the acid intoxication and have more food value.

CASE 13. Ralph C., two years old, had always been well except for an occasional attack of acute gastric or intestinal indigestion. He had had nothing unusual for supper, but had eaten a good deal hurriedly and had been a good deal excited after supper. He began to vomit and to be feverish about midnight. The vomitus consisted first of his supper and then of water and mucus. He had apparently had no pain, and had been clear mentally. The bowels had not moved. He had no cough. He was seen at 5 A.M.

Physical Examination. He was well developed and nourished, but a little pale. He vomited twice during the examination. He was perfrectly clear mentally. There was no motion of the alæ nasi and the respiration was quiet. There was no rigidity of the neck. The pupils were equal and reacted to light. The tongue was moist, moderately coated and not reddened. The throat was normal. The heart and lungs were normal. The abdomen was a little sunken and lax. There was no tenderness, muscular spasm, tumor or dullness. The liver was just palpable, the spleen was not. The extremities were normal. There was no spasm or paralysis. The knee-jerks were equal and normal; Kernig's sign and the neck sign were absent. There was no rash. The membranæ tympanorum were normal. The rectal temperature was 103.5° F., the pulse 130, the respiration 30.

Diagnosis. The sudden appearance of vomiting and fever is consistent at this age with the onset of almost any acute disease, and it is often impossible as early as this to make a positive diagnosis. Certain diseases are more probable, however, than others. These are, in the first place, acute gastric indigestion, pneumonia and scarlet fever; in the second place, tonsillitis, influenza, otitis media and meningitis, especially of the cerebrospinal form.

The normal ear drums rule out otitis media; the absence of reddening of the throat and enlargement of the tonsils, tonsillitis. Meningitis, beginning with such acute symptoms as in this instance, would almost certainly have shown by this time some signs of meningeal irritation, none of which are present. The relatively slow rate of the respiration in comparison with the pulse practically rules out pneumonia.

The absence of cough, of motion of the alæ nasi and of physical signs in the lungs, together with the quiet respiration, are also against it, but not nearly as important as the relatively low rate of the respiration. The absence of inflammation of the throat and enlargement of the papillæ of the tongue is against scarlet fever, but does not rule it out, as they might not have developed at this time. The rash would not, of course, have appeared thus early. Scarlet fever is, therefore, a possibility. Influenza is always a possibility with this history, as its manifestations are so manifold. The abdominal type is, however, much less common at this age than the respiratory type. The history of attacks of acute gastric indigestion in the past, the hurried and hearty supper with the subsequent excitement, the absence of the signs characteristic of other diseases and the fact that acute gastric indigestion is very common while the other conditions to be considered are relatively rare, make the diagnosis of acute gastric indigestion altogether the most probable. The final diagnosis is, therefore, ACUTE GASTRIC INDIGESTION, with the bare possibility that it may be scarlet fever or influenza. Twenty-four, or at most forty-eight hours, will settle the diagnosis positively, either by the cessation of the symptoms or the development of something more definite.

Prognosis. The prognosis as to life is, of course, absolutely good. The vomiting will probably cease during the day. He will, however, probably have more attacks unless his diet and routine are very carefully regulated.

Treatment. The treatment should be on the basis of the diagnosis of acute gastric indigestion. It will do no harm if the true diagnosis proves to be scarlet fever or influenza. The first thing to do is to cleanse the stomach. The quickest and most effective way to do this is to wash out the stomach. This is a very simple operation in a child of this age. A soft rubber catheter, No. 16 American, is used. It should be passed through the mouth and the stomach washed with plain water, or a weak solution of bicarbonate of soda, until the wash water returns clear. The stomach may also be cleansed, but less quickly and effectually, by giving copious drinks of water which will probably be immediately vomited.

Food should be entirely withheld for from eight to twelve hours. Whey or broth, in one or two-ounce doses, every one or two hours, may then be given. A solution of bicarbonate of soda, one-half teaspoonful to a glass of water, given in teaspoonful doses every fifteen to thirty minutes, will probably help to quiet the stomach.

After the stomach has been cleansed and rested for an hour or two, a dessertspoonful of castor oil should be given. This may be vomited, but will probably be retained. If it is vomited, one-half teaspoonful doses of milk of magnesia, given at hour intervals, until three teaspoonfuls have been given, will probably be retained.

Sponge baths of 95% alcohol and water, equal parts, at 90° F., will reduce the fever and make the child more comfortable.

CASE 14. Robert M. was the first child of healthy parents. He was born at full term after a normal labor, and weighed six pounds and ten ounces. He was nursed entirely for a month, digested well, and went up to seven pounds and fourteen ounces. The breast-milk then began to diminish and was helped out by a home-modified milk which contained 3.50% of fat, 6.00% of sugar and 0.70% of proteids. The baby soon began to have the colic and lose weight, while the stools contained large tough curds, showing casein indigestion. The breast-milk then gave out entirely and he was given a milk mixture prepared with Eskay's Food, which contained 3% of fat, 3.50% of sugar, 0.75% of proteids and 2% of starch, alternating with barley water, containing 1.50% of starch. Possibly because of the starch in the Eskay's Food and barley water he ceased to pass the large tough curds, but began to vomit and to lose weight steadily. When two months old he was taken to a hospital, where he remained until he was five months old. While there he was fed on various milk mixtures and improved somewhat. He continued to vomit, however. His weight on leaving the hospital was eight pounds and twelve ounces. He was then put on a modified milk of unknown composition prepared with Mellin's Food. This, of course, practically amounts merely to the substitution of malt sugar for milk sugar in the milk mixture. He gained at first to nine pounds, but soon began to refuse his food, vomit and lose weight again. He was then given a mixture of one-third gravity cream and two-thirds barley water, which is equal to a mixture containing 5% or more of fat, 1.50% of sugar, 1.15% of proteids and 1.00% of starch. He gained again for a time, but soon began to vomit more than before. A malted milk mixture was then given. This, like the Mellin's Food mixture, amounted to little more than giving malt sugar in place of milk sugar. He kept this down and gained for a time, but soon began to vomit worse than ever. The doctor then said that the baby "could not take cow's milk," and put him on Allenbury's Food No. 1, prepared according to directions. This was about a week before he was seen. The composition of the mixture was, according to the proprietor's figures, 3.33% of fat, 10.20% of lactose,

1.00% of albumin and 1.12% of casein. He had a great deal of gas after beginning this and continued to vomit. The bowels, which had been somewhat constipated, became loose, and the movements, which had been of good character, were undigested and contained a good deal of mucus. He was taking seven or eight feedings of from four to four and one-half ounces of the Allenbury's Food mixture, at two and one-half-hour intervals, when he was seen in consultation, when seven months old.

Physical Examination. He was bright and happy. He was small and poorly nourished, but of good color. The skin was in good condition. The fontanelle was 3 cm. in diameter and level. There was no rigidity of the neck. He had no teeth. The mouth, tongue and throat were normal. The heart and lungs were normal. The abdomen was large but not tense. The liver was palpable 3 cm. below the costal border in the nipple line. The spleen was not palpable. The lower border of the stomach did not reach to the navel. The stomach was not visible even after taking his bottle, and there was no visible peristalsis. The abdomen was negative. There was a small umbilical hernia. The extremities were normal. There was no spasm or paralysis; the knee-jerks were equal and lively; Kernig's sign was absent. There was no enlargement of the peripheral lymph nodes. The weight was nine pounds and four ounces.

Diagnosis. The physical examination shows nothing abnormal except the signs of malnutrition. The diagnosis must be made, therefore, on the history. The continued vomiting shows that the gastric digestion was disturbed. The normal character of the movements up to the last change in the food shows that the intestinal digestion was not affected until the very end. The tendency to constipation was presumably due to the facts that much of the food was vomited and that the portion which passed into the intestine was so small that little residue was left to form feces. The diagnosis is, therefore, CHRONIC GASTRIC INDIGESTION.

It is very difficult in this instance to draw any very definite conclusions as to what element or elements of the food were at fault. In general, the percentages of the fat were not

excessive, most of the time being below 3.50% and only once above 4%. The proteids were usually both absolutely and relatively high. The sugars were at times excessive, especially in the last mixture, which contained over 10% of lactose. The increase in the amount of gas at this time and the change for the worse in the character of the movements suggest that sugar was not well borne. The food at times contained more starch than many babies of this age can digest. The symptoms were no more marked at such times, however, than they were when there was no starch in the food. The only conclusions which can be drawn are that the baby is unable to digest large amounts of sugar, and, by exclusion, that the somewhat excessive amounts of starch in the food may possibly have played a part in the production of the trouble.

Prognosis. Chronic gastric indigestion is always a serious condition, one never to be regarded lightly. In this instance, however, the comparative mildness of the symptoms and the baby's reasonably good condition justify, barring accidents, a favorable prognosis.

Treatment. The best food for this baby, as for all babies suffering from chronic gastric indigestion, is good human milk. With it recovery is certain to be rapid. It is not a necessity in this instance, however, and the baby will probably recover in time without it. The best substitute for it is some modification of cow's milk. A doctor has said, however, that this baby "can't take cow's milk." Is this statement true in this instance, or is it ever true? The author believes that it is extremely unusual for a baby to be born with an idiosyncrasy against cow's milk. He also believes that the improper use of cow's milk may develop a temporary, but not a permanent, intolerance for cow's milk. There is nothing in this baby's history, however, to show that it cannot digest cow's milk, if properly modified to suit its digestive capacity, most of the modifications which it has had in the past having been unsuitable in some way or other.

The only definite indications to be drawn from the history of this baby as to the regulation of the food are to keep the sugar comparatively low and not to give starch. On general principles, it is advisable to keep the fat a little low when

babies are vomiting. It is wiser, therefore, not to give this baby more than 2% of fat at first. In chronic gastric indigestion the food should, if possible, be so regulated as to diminish the work of the stomach and throw it on the intestine. The addition of an alkali to the food retards the coagulation of casein by rennin and allows the liquid milk to pass into the intestine, thus throwing the work of digestion from the stomach on to the intestine. If the lime water, the alkali most often used, is equal to 50% of the milk and cream in the mixture, it practically prevents the coagulation of the casein and throws all the work on the intestine. If the lime water is 25% of the milk and cream, it throws a proportionate part of the work on the intestine, and so on. It is evident that as the important relation is between the casein and the lime water, and as the milk and cream are the only substances in the mixture containing casein, the amount of lime water to be added must be calculated in relation to the milk and cream and not in relation to the total quantity of the mixture, which is made up largely of water, or to whey, which contains no casein. Lime water is indicated in this instance, therefore, and in the proportion of 25% of the milk and cream in the mixture. Whey proteids are not acted on by rennin, leave the stomach quickly and throw but little work upon it. They are, therefore, indicated in this instance. The following formula meets these indications:

Fat,	2.00%
Milk sugar,	5.50%
Whey proteids,	0.75%
Casein,	0.25%
Lime water,	25.00% of the milk and cream.

Four ounces is as much as he should have at a feeding. Eight feedings, at two and one-half hour intervals, gives 103 calories per kilo, and 2.3 grams of proteid per kilo, which covers both the caloric and proteid needs.

If whey mixtures are not satisfactory, pancreatization of suitable milk and cream mixtures may be tried.

No drugs are indicated. The symptoms at present are hardly severe enough to require lavage.

CASE 15. Mary D., five and one-half months old, had always been a perfectly well, breast-fed baby. About 6 A.M., September 6, she suddenly began to cry and to put her hands on her abdomen. The crying continued for half an hour or more. At about this time she had three movements consisting almost entirely of bright blood. After this she vomited two or three times. The character of the vomitus was not noticed. Judging from the story, she evidently was somewhat collapsed for a short time after the onset of the pain. She was seen about 7.30 A.M. by her physician, who examined the abdomen but found nothing abnormal. He did not consider the condition an important one, although he watched the case very carefully afterward. She continued to have seven or eight small movements daily, which consisted entirely of mucus and blood. The amount of blood, however, had steadily diminished. The movements contained no fecal matter. A bismuth mixture, which was ordered at the first visit, was vomited. There was no more vomiting until the noon of the 8th, since when she had vomited almost constantly. She continued to take the breast well. She had had no very sharp attacks of pain, but had slept very little, moaning most of the time. She did not seem very sick until the 8th and had noticed things and played a little that afternoon. The temperature had been taken morning and evening, but had never been over 100° F. The mother thought that she felt a bunch in the abdomen the evening of the 7th, but both the mother and the doctor failed to find it the next morning. She was given two teaspoonfuls of castor oil the morning of the 8th, which were vomited, and also several large injections of salt and water, which brought away nothing but mucus and blood. She was seen in consultation at 9 P.M., September 8, sixty-three hours after the onset.

Physical Examination. She was well developed and nourished. There was slight pallor. Her face was drawn and anxious. She noticed a little. The fontanelle was nearly level. The tongue was slightly dry, but not coated. The heart and lungs showed nothing abnormal. The liver was palpable 3 cm. below the costal border in the nipple line. The spleen was not palpable. The level of the abdomen was

somewhat below that of the thorax. An indefinite resistance was felt in the left lower quadrant. There was no muscular spasm, but a little tenderness in this region. The rest of the abdomen was negative. Rectal examination showed more resistance in the left half of the abdomen than in the right, but nothing at all definite. The extremities showed nothing abnormal. There was no enlargement of the peripheral lymph nodes. The rectal temperature was 100.4° F., the pulse 180.

Diagnosis. The diagnosis of INTUSSUSCEPTION is so plain in this instance that it is hard to understand how it could have been mistaken for infectious diarrhea, as was done. The sudden onset of severe abdominal pain with partial collapse, the vomiting and the passage of bright blood are pathognomonic of intussusception and entirely different from the slow onset of infectious diarrhea. The further course of the disease, with continued abdominal pain and numerous stools of mucus and blood without fecal matter, is most characteristic. Pain is uncommon, except at the time of defecation, in infectious diarrhea at this age, and some of the movements always contain fecal matter. The physician was undoubtedly misled by the facts that the baby nursed well and did not appear very ill. It is, however, not at all uncommon for babies with intussusception to take their food well almost to the end, and the general condition is often not much affected during the first thirty-six hours or so. He was also probably further misled by the moderate temperature. This, again, is characteristic of intussusception, high fever being very unusual. He should have paid more attention to the mother's story of a bunch in the abdomen and not have trusted so much to his own negative examination, for it often happens that the tumor can be felt at one time and not at another. The failure to obtain fecal matter from the injections should also have suggested intussusception. The castor oil was, of course, very bad treatment. If it had been retained, it would have merely made the intussusception tighter.

The physical examination, as often happens in intussusception, aids but little in the diagnosis. The strained and anxious

face are suggestive of intussusception, but not inconsistent with infectious diarrhea. The indefinite resistance and slight tenderness in the left lower quadrant and the increased resistance in the left half of the abdomen on rectal examination are corroborative of the diagnosis of intussusception, but without the history would not be of much importance.

Prognosis. The prognosis is very grave. It is almost certain that during the sixty-three hours since the onset adhesions have formed so that the intussusception cannot be reduced. The circulation has been interfered with so long that the gut is almost certainly gangrenous. A resection will undoubtedly have to be done. There is not one chance in ten for recovery.

Treatment. The only possible treatment is immediate operation.

CASE 16. Sophie M., nine months old, was the child of healthy parents. She was born at full term after a normal delivery and had always been well. She had been nursed irregularly, but had had no other food except occasionally a little zwiebach.

She woke up from a nap crying, evidently from pain in the abdomen, about noon, April 11. She was pale for some time after she ceased crying. She had nursed well since then but had vomited everything taken, including a number of cathartics, almost immediately. The vomitus consisted of the food taken, with a little water and mucus; it was never greenish or brownish. She had had no fecal movement of the bowels, although numerous enemata had been given. Once she had passed " a small glassful of clear blood." She had apparently not been much feverish and had apparently not had any pain since the onset. She had passed very little urine. She was seen at noon, April 13, forty-eight hours after the onset.

Physical Examination. She was well developed and nourished and a little pale. She was moderately prostrated, but her face was not pinched and her eyes were clear. The anterior fontanelle was slightly depressed. The pupils were equal and reacted to light. There was no rigidity of the neck or neck-sign. The tongue was rather dry, but not red or coated. The throat was normal. The heart and lungs were normal. There was no rosary. The liver was just palpable. The spleen was not palpable. The level of the abdomen was a little below that of the thorax. There was no definite muscular spasm, but the whole abdomen was held a little rigidly, especially in the right lower quadrant. There was no tenderness or dullness. Nothing at all definite could be made out in the right lower quadrant, but it seemed as if there was a little more resistance there than on the other side. Rectal examination showed nothing abnormal. The rectum was empty. There was no blood on the examining finger. The extremities were normal. There was no spasm or paralysis; the knee-jerks were equal and normal; there was no Kernig's sign.

There was no enlargement of the peripheral lymph nodes. The rectal temperature was 98.6° F., the pulse 136.

Diagnosis. The diagnosis in this instance lies between acute gastric indigestion, with secondary constipation, and intussusception. The points in favor of intussusception are the sudden onset in a breast-fed baby, the continued vomiting, the absence of fecal movements, the history of the movement of blood, and the slight rigidity and sense of resistance in the right lower abdomen. The points against intussusception are the character of the vomitus, the slight amount of prostration, the absence of an abdominal tumor, the negative rectal examination and the low temperature. It may also be argued that the history of the passage of " a small glassful of clear blood " was probably untrue, and that if the baby had passed blood once it would certainly have passed it again if the condition was intussusception. The small amount of urine is, of course, of no importance, merely meaning that very little fluid was retained.

There is no question as to the validity of the objections to the diagnosis of intussusception. They are, however, all unimportant compared with the almost pathognomonic combination of the sudden onset of abdominal pain in a breast-fed infant, the constant vomiting, the obstipation and the passage of blood. These are positive symptoms; the others are merely negative. The absence of fecal vomiting can be explained on the ground that the reverse peristalsis is not very active; the absence of frequent movements of blood and mucus, on the ground that the constriction is not very tight, and that consequently there is not much congestion or exudation into the bowel, and not much peristalsis set up. The absence of a tumor can be explained by the absence of a very tight constriction or of marked swelling, or by the deep location of the tumor; the absence of a tumor on rectal examination, by the high position of the intussusception; and the low temperature by the absence of absorption.

These signs are so characteristic of INTUSSUSCEPTION that it is hardly necessary to attempt to rule out other forms of intestinal obstruction. Some other form is, however, a possibility. Fortunately, the treatment is the same in any instance.

Prognosis. The chances for recovery are about even in this instance, with a good surgeon, if operation is done at once.

The absence of fecal vomiting and frequent movements, the good general condition, the low temperature and the short duration of the intussusception are all favorable points.

Treatment. The only rational treatment for intussusception at any stage is immediate operation as soon as the diagnosis is made. Attempts at reduction by inflation of the bowel with water or air are in rare instances successful. In the vast majority of cases, however, they are unsuccessful, they waste time and use up the child's vitality. It is impossible, moreover, to know at once whether the intussusception has been reduced or not by these measures, so that on this account still more time is wasted. An early operation is usually successful, because at this time the intussusception can be easily reduced, while the dangers from opening the abdomen are slight in skilled hands. When the operation is delayed, the intussusception can usually not be reduced because of adhesions, and the bowel is irreparably damaged. A resection has to be done or an artificial anus made. Under these circumstances the baby almost invariably dies.

CASE 17. Robert A., fifteen months old, was the first child of healthy parents. He was breast-fed during the first year and was not constipated during this time. He was then given a mixture of Mellin's Food and milk and became very much constipated. After that he was given Imperial Granum, and other articles of diet were soon added. When seen he was taking milk, oat jelly, bread, orange juice and Bovinine. The bowels did not move except with the aid of gluten suppositories. The movements were large, brown or yellow in color, coated with mucus, and usually had bright blood on the outside. Defecation was very painful. During it the child became cold and perspired and stiffened out. Otherwise he was well. He sat up but did not creep or try to stand. He apparently did not have too large an amount of food.

Physical Examination. He was good-sized but fat and flabby. The muscles seemed poorly developed. His color was good. The fontanelle was nearly closed. The tongue was clean. He had twelve teeth. There was a slight rosary. There was also a slight retraction of the chest at the insertion of the diaphragm. The abdomen was not distended and was perfectly lax. The liver was palpable 1 cm. below the costal border in the nipple line. The spleen was not palpable. The extremities were normal except for a slight enlargement of the epiphyses at the wrists. There was no spasm or paralysis. The knee-jerks were equal and normal. There was no Kernig's sign. There was no enlargement of the peripheral lymph nodes. The genitals were normal except that the prepuce was rather tight. There was a crack at the edge of the anus, both back and front, about one quarter of an inch long and one eighth of an inch deep. This crack bled easily when the anus was stretched. Rectal examination was negative.

Diagnosis. The diagnosis of constipation is, of course, evident. This diagnosis is, however, not sufficient. It is necessary to determine the type and the cause of the constipation. The pain during defecation and the bright blood on the outside of the movement are almost enough of themselves to justify the diagnosis of fissure of the anus without physical examination. This condition is, of course, proved by the

physical examination. The fissure and the pain caused by it are, therefore, the cause of the constipation, and the constipation is of the spasmodic type. The large size of the movements suggests some other etiological factor. This suggestion is corroborated by the facts that the child does not creep or try to stand, and the general flabbiness. That is, the muscular development is poor. It is fair to assume that the intestinal muscles are also weak and the intestinal peristalsis feeble. The constipation is, therefore, partly of the atonic type. The cause of the weakness of the muscles is shown by the rosary, the retraction of the lower chest and the enlargement of the epiphyses at the wrists, all of them manifestations of rickets. The final diagnosis is, therefore, CONSTIPATION, chiefly OF THE SPASMODIC TYPE; FISSURE OF THE ANUS; MILD RICKETS. An interesting point is that the malt sugar in the Mellin's Food, which usually acts as a laxative, had the opposite effect in this instance.

Prognosis. The prognosis is perfectly good with time and proper treatment. The fissure should heal in a few weeks with very simple treatment. Stretching the sphincter is almost never necessary. It will probably take somewhat longer to relieve the constipation because, on account of the pain in the past, the child will continue to be afraid to have a movement even after the fissure is healed, and the atonic element will remain after the spasmodic element is relieved. The active stage of the rickets, shown chiefly by the weak musculature, should yield quickly to treatment. The bony signs will persist for many months but will eventually disappear.

Treatment. The first object of the treatment is to heal the fissure. To do this, it is first necessary to keep the movements soft. Until this is accomplished by regulation of the diet, it can best be done with an enema of an ounce of sweet oil daily. If this is not effectual, he may be given one or two teaspoonfuls of milk of magnesia in his milk daily. Local cleanliness and the application of boracic acid ointment will then quickly heal the fissure. It will almost certainly not be necessary to stretch the sphincter.

A rational routine and diet for him will be as follows:

6 A.M. Whole milk, 8 ounces.

9 A.M. Orange juice, 2 tablespoonfuls.

10 A.M. Oat jelly, 2 or 3 tablespoonfuls. Whole milk, 10 ounces.

2 P.M. Mutton or chicken broth, 3 ounces; or beef juice, 2 tablespoonfuls. Bread or zwiebach, 1 slice. One-half baked apple or 2 tablespoonfuls of prune juice. Whole milk, 4 ounces, if desired.

6 P.M. Oat jelly, 2 or 3 tablespoonfuls. Whole milk, 10 ounces.

Water should be forced.

Massage of the abdomen twice daily will stimulate the peristalsis and improve the muscular tone. Much fresh air and sunlight will help the rickets and general condition, and hence the atonic element of the constipation. Tincture of nux vomica, in drop doses, three times a day, before meals, will also tend to improve the general condition and the intestinal tone.

CASE 18. Malcolm B., the third child of healthy parents, was born at full term after a normal labor. He was normal at birth and weighed eight pounds. He was nursed for nine months, but during the last two months had had one or two feedings of modified milk daily in addition. He was then weaned and given an unmodified top milk, which contained about 7.50% of fat, 4.50% of sugar and 3.50% of proteids. The bowels, which had previously moved regularly, immediately became constipated, enemata, suppositories or some drug being always required to get a movement. The movements were white, dry and crumbling and had a disagreeable acid odor. There was no vomiting. He took nothing but this top milk, except occasionally a little broth with rice, until he was fourteen months old. He was then changed to five feedings of seven ounces of a top milk and Mellin's Food mixture, which contained about 5.70% of fat, 6% of sugar and 3% of proteids, and after about three weeks was given a little beef juice in addition. The constipation was rather less marked on this diet but still very troublesome. He was seen when fifteen months old.

Physical Examination. He was well developed and nourished, but flabby and a little pale. The fontanelle was 2 cm. in diameter. He had seven teeth. His tongue was clean. There was no rosary. The heart and lungs were normal. The abdomen was negative, its level a little below that of the thorax. The liver was just palpable. The spleen was not palpable. The extremities were normal. There was no spasm or paralysis; the knee-jerks were equal and normal; Kernig's sign was absent. There was a slight general enlargement of the peripheral lymph nodes. The weight was twenty-two pounds and eight ounces.

Diagnosis. The chief trouble is, of course, CONSTIPATION. Constipation is, however, really a symptom and not a disease. It is not a satisfactory diagnosis unless modified by some term denoting the cause of the constipation. In this instance the cause of the constipation is very evident, namely, the excessive amount of fat in the food. No more than four per cent of fat should ever be given; he was getting nearly twice that. The white, dry and crumbling stools are most

characteristic, being composed of unutilized fat in the form of soaps. The improvement after the change of food, one result of the change being a reduction in the amount of fat, is further evidence that an excess of fat was the cause of the constipation. A part of the improvement may possibly, however, be attributed to the malt sugar in the Mellin's Food and the beef juice, both of which usually have a laxative action. The flabbiness of the skeletal muscles indicates an additional atonic element in the etiology, because, when the skeletal muscles are feeble, the intestinal muscles are usually in the same condition.

Prognosis. The prognosis is good for rapid recovery, because the chief cause of the trouble, the excess of fat in the food, can be removed at once.

Treatment. The treatment is, of course, primarily by regulation of the diet to remove the cause of the trouble. Whole milk, or whole milk with an ounce of oat water to each feeding, will probably give a sufficiently low fat. He is old enough to have something beside milk; in fact, babies of his age are almost certain to do badly in some way if they do not have something to eat beside milk. A reasonable diet to start him on is as follows:

Whole milk or whole milk with oat water.

Beef juice, one or two tablespoonfuls; or

Mutton or chicken broth, two to four ounces, once daily.

Bread or zwiebach in broth or beef juice.

Barley jelly, oat jelly, farina or rice, one to three tablespoonfuls twice daily.

Orange juice, one to three tablespoonfuls, once daily.

While regulation of the diet is removing the cause of the trouble, it may be necessary to relieve the symptom, constipation, for a time by the use of enemata of suds or sweet oil, suppositories of soap, glycerin or gluten, or milk of magnesia, in doses of from one-half to one teaspoonful once or twice daily.

It goes without saying that fresh air, a good routine and everything which tends to improve the general condition will aid in the relief of the constipation by improving the muscular tone and removing the atonic element.

CASE 19. Charles B., seven and one-half years old, was not very carefully fed, but had not been especially indiscreet just before the onset of this illness. He had had a number of similar attacks in the past.

He complained of pain in his stomach in the late afternoon of December 2, and vomited a considerable amount of undigested food and mucus mixed with bile. His temperature that night was 104° F. He nevertheless slept well. He vomited several times during the next two days and the vomitus always contained bile. The bowels did not move either day, as all the drugs given were vomited. His temperature ranged between 100° F. and 102° F. He had no pain. He did not seem very sick, but did not care to get out of bed. He did not want anything to eat, but had taken a little milk and broth. A dose of Epsom salts given on the morning of the 5th was retained and resulted in several large, loose, gray or light grayish-yellow movements, which had a very foul odor, but did not contain undigested food or mucus. Slight yellowishness of the conjunctivæ was noticed that afternoon. He was seen at 4 P.M., December 5.

Physical Examination. He was well-developed and nourished and perfectly clear mentally. He was a little pale. The conjunctivæ had a slight yellow tinge. The tongue was moist and moderately coated; the papillæ were unusually distinct. The mouth and throat were normal. There was no rigidity of the neck. The heart and lungs were normal. The level of the abdomen was below that of the thorax. There was no muscular spasm or tenderness and no masses were felt. The upper border of the liver flatness was at the upper border of the sixth rib in the nipple line. The liver was palpable just below the costal border in the nipple line. It was not tender. The gall-bladder was not palpable and there was no tenderness in this region. The spleen was not palpable. The extremities were normal. There was no spasm or paralysis; the knee-jerks were equal and normal; there was no Kernig's sign. There was no enlargement of the peripheral lymph nodes. The rectal temperature was 99.2° F.; the pulse was 80.

The urine was clear and dark reddish yellow in color; when

shaken the froth was yellow. The reaction was acid; the specific gravity, 1,024. It contained neither albumin, sugar nor acetone. The sediment showed nothing abnormal.

Diagnosis. Inflammation of the gall-bladder and gallstones are extremely rare at this age. The absence of pain and of enlargement and tenderness of the gall-bladder, together with the low temperature, exclude them in this instance. The vomiting of bile, the enlargement of the liver (which should not be palpable at this age), the yellowness of the conjunctivæ, the clay-colored stools and the dark urine are so characteristic of ACUTE DUODENAL INDIGESTION that it is hardly necessary to exclude other diseases. A number of other conditions ought, perhaps, to be considered, however, for the sake of completeness. These are, acute gastric indigestion, recurrent vomiting and appendicitis. None of them show jaundice, clay-colored stools or bile in the urine. There is none or very little fever in recurrent vomiting, and there are local signs in the abdomen in appendicitis. Tubercular meningitis should be thought of in this instance, as always when a child vomits. It can, of course, be excluded at once on the presence of the characteristic symptoms of duodenal indigestion and the absence of all signs of meningeal irritation.

Prognosis. There is, of course, no danger as to life. The most acute stage is already over. It will probably be one or two weeks, however, before bile reappears in the movements and convalescence really begins. During this time, while not seriously ill, he will be very miserable and irritable. If he is neglected or improperly treated, there is considerable danger that the condition will run over into chronic duodenal indigestion. He is almost certain to have more attacks in the future, unless great care is taken with his diet.

Treatment. The most acute stage being over, the treatment is now principally regulation of the diet. Experience has shown that these patients do best when they are fed almost entirely on proteids, the starches being kept low, and the fats and sugars entirely excluded. A reasonable diet for him at present is whey, skimmed milk, junket from skimmed milk, strained broths, beef juice, white of egg, and toast

bread and zwiebach in small amounts. Lean meat and simple cereals may be added to his diet as he improves; next, orange juice and green vegetables. It is always wise to wait longer than seems necessary before increasing the diet.

There is no drug which will diminish the swelling in the duodenum or at the orifice of the common bile duct. Time and rest of the duodenum by care in the diet will alone accomplish this. The so-called " cholagogues " are contra-indicated for two reasons: they do not increase the flow of bile and there would be no object in increasing it, if they did. Phosphate of soda in doses of a teaspoonful, more or less, is the best laxative. Tincture of nux vomica seems to be of some utility in these cases and is worthy of a trial. Seven drops, three times a day, before eating, is about the right dose for this patient.

He must be kept in bed and kept warm until convalescence is well established, because over-exertion and chilling are very apt to bring on a relapse.

CASE 20. Russell H., three years old, was born at full term, was normal at birth and weighed ten and one-half pounds. His parents were healthy and there had been no known exposure to tuberculosis. He was breast-fed and when six months old weighed thirty pounds. His mother began to give him other food very early and for the past year his diet had been very unsuitable for a child of his age. He was given very little meat or vegetables, but many sweets and bananas. His appetite had been poor for nearly six months, during which time he had lost eight pounds. Recently it had been necessary to force him to eat. He had not vomited, but was inclined to constipation. The movements were at times greenish; at others, clay-colored. They never contained mucus. He had been very forward up to the past six months. Since then he had grown steadily weaker, so much so that he had fallen down several times on a short walk two days before. His mother said that he " seemed tired all the time," and that he did not " romp and play " as formerly. He was irritable and picked his nose a great deal. His mother, suspecting worms, had given him "True's Elixir " several times, but had never obtained any worms. He had had no serious illnesses, merely an occasional cold.

Physical Examination. He was fairly developed and nourished. His color was fair. There was no jaundice. His tongue was moist and moderately coated; the papillæ were unusually distinct. There was a tendency to keep his mouth open and a small amount of adenoids was felt with the finger. The tonsils were not enlarged. The heart and lungs were normal. The liver and spleen were not palpable. The abdomen was moderately enlarged, but lax. There were no indications of fluid and no masses were felt. The extremities were normal. There was no spasm or paralysis; the knee-jerks were equal and normal. There was no enlargement of the peripheral lymph nodes. He weighed thirty-seven pounds.

The urine was pale, acid in reaction and contained neither albumin nor sugar.

Diagnosis. Loss of appetite, progressive failure in weight and strength and irritability are symptoms common to so many diseases that they are of no special importance in diag-

nosis. The history of over-feeding with sweets and bananas and of clay-colored stools, together with the enlargement of the abdomen, when taken with these other symptoms, are, however, most characteristic of CHRONIC DUODENAL INDIGESTION and amply sufficient to justify that diagnosis. The moist coated tongue with prominent papillæ is another point in favor of this disease. The only other possibility worthy of serious consideration is chronic diffuse tuberculosis. While this might account for the general symptoms, chronic duodenal indigestion does so equally well. There are no local manifestations of tuberculosis, and several of the characteristic symptoms and signs of chronic duodenal indigestion are present. Tuberculosis can, therefore, be ruled out.

The mother's diagnosis of "worms" would not be worth mentioning if this diagnosis was not made so often, not only by mothers and grandmothers, but also by doctors who ought to know better, when children lose their appetite and are irritable, especially if they pick their noses. None of these symptoms are characteristic of the presence of worms. Picking the nose is merely a manifestation of nervousness; irritability and anorexia of a host of conditions. In fact, the author's experience leads him to believe that when children are thought to have worms they are almost invariably suffering from some other trouble and that when worms are found the children usually seem perfectly well. The absence of worms in the stools after the administration of an anthelmintic rules them out in this instance.

Prognosis. There is no danger to life except from intercurrent disease, to which the child is predisposed by his weakened condition. Recovery is likely to be slow at best and to be interrupted by relapses. How rapidly he improves depends largely on how carefully the mother follows directions. It will be two or three months, at any rate, before he is well. He is very likely to have a recurrence of his trouble unless he is very carefully fed and watched over for several years.

Treatment. The treatment is mainly dietetic. Sweets and fats must be entirely excluded from his diet for a time, and starches given only in moderation. The following diet is a reasonable one for him:

Skimmed milk.
Mutton broth.
Chicken broth.
Beef broth.
Beef juice.
White of egg.
Lamb chop.
Mutton chop.
Roast chicken.
Boiled chicken.
Roast lamb.
Roast mutton.
Beef steak.
Roast beef.
Scraped beef.
Boiled fish.
Stale bread.
Toast bread.
Whole wheat bread.
Milk toast.
Zwiebach.
Plain crackers.
Educators.
Barley jelly.
Oatmeal jelly.
Pettijohn.
Cream of wheat.
Wheat germ.
Farina.
Rice.
Baked potato.
Mashed potato.
Plain macaroni.
Peas.
String beans.
Spinach.
Asparagus.
Summer squash.
Lettuce.
Stewed celery.
Orange juice.
Junket.
Blanc mange.
Tapioca.

After he begins to improve, the amount of the starches may be increased, then yolk of egg and a little butter added, and finally whole milk substituted for skimmed milk. It is wise, however, to be very cautious about increasing the diet. Sugar, or foods containing sugar, must not be given for many months; saccharin may be used in its place if necessary. Hygienic treatment is also of importance. It is especially necessary to avoid fatigue and chilling. He should take a rest of one or two hours at noon, get up late and go to bed early, and be warmly dressed, especially about the abdomen.

Tincture of nux vomica seems to help this condition. The dose for this boy is three drops, three times a day, before meals, given in a little water, not in syrups or mixtures. He may not like it, but he can be made to take it. Phosphate of soda and cascara sagrada are the best laxatives, if any are needed.

CASE 21. John F., the third child of healthy parents, was born at full term after a normal labor, was normal at birth and weighed eight pounds and twelve ounces. He was put at once on a weak modified milk, as there was no breast milk. The milk was gradually strengthened until, when he was three and one-half weeks old, he was taking a mixture containing about 5% of fat, 3.50% of sugar and 1% of proteids. He thrived on this until he was five weeks old, when his temperature suddenly rose to 103.8° F. and his abdomen became distended. He then had a large, watery, green, foul movement and the temperature dropped to 100.8° F. He was given a half a teaspoonful of castor oil and put on barley water containing 1.50% of starch. He had several small movements like the first from the castor oil. Twenty-four hours later, as he seemed much better, his mother put him back on the milk mixture. The temperature rose again in a few hours to 103.8° F., the abdomen became distended again and he became stupid and twitchy. He was seen in consultation that evening.

Physical Examination. He was fairly developed and nourished and of fair color. The fontanelle was a little depressed. There was no rigidity of the neck. The pupils were equal and reacted to light. The mouth was dry; the tongue slightly coated. The heart and lungs were normal. The abdomen was much enlarged, tense and everywhere tympanitic. There was no localized muscular spasm. The liver and spleen were not palpable. The extremities were normal. There was considerable spasm of both arms and legs with a tendency to twitching; there was no paralysis; the knee-jerks were equal and lively; Kernig's sign was absent. There was no enlargement of the peripheral lymph nodes. There was no evidence of inflammation about the navel. The rectal temperature was 103.5° F.

Diagnosis. There can be no doubt, of course, that the location of the disturbance is in the intestine. The green, foul movements, the high temperature and the evidences of toxic absorption show that there is something more than a disturbance of the equilibrium of digestion, that fermentative processes are going on in the bowel and that the condition is

bacterial in origin. The small number of movements and the absence of mucus and blood show that the intestinal wall is probably not involved. The diagnosis is, therefore, ACUTE INTESTINAL INDIGESTION OF THE FERMENTATIVE TYPE.

The stupor, the spasm of the extremities and the tendency to twitching would be considered by many to be evidences of a complicating meningitis. Meningitis is, however, a very unusual complication of the acute diarrheal diseases of infancy, while symptoms of meningeal irritation are not at all uncommon. Meningitis is, therefore, extremely improbable in this instance. The depression of the fontanelle alone is, moreover, almost sufficient to rule it out. The nervous symptoms are to be regarded, therefore, merely as evidences of toxic absorption, or possibly as effects of the high temperature.

It is possible that the excessive amount of fat in the food may have predisposed the baby to this attack by disturbing the equilibrium of the digestion.

Prognosis. The condition is a grave one because of the age of the patient, the distention of the abdomen, the high temperature and the presence of nervous symptoms. The facts that the temperature dropped and the general condition improved rapidly after he was cleaned out and the milk stopped make it probable that a repetition of the treatment will have the same result. Put in figures, the chances are probably about three to one in favor of recovery.

Treatment. The first thing to do is to empty the bowels. Castor oil is the safest and most effectual drug for this purpose. As the object of the oil is to clean out the bowels, the dose must be large enough to do it. Two teaspoonfuls is none too large, even for a baby of five weeks. In the meantime the colon should be irrigated in order to relieve the distention and empty the lower bowel. It will probably not be necessary to repeat it unless the distention recurs, because the chief seat of the trouble is in the small, not in the large, intestine.

All food must be stopped. Babies bear the withdrawal of food without much difficulty, but cannot get on without water. They must be given as much water in the twenty-four hours as they normally get in their food. This baby needs at least twenty ounces of water in the twenty-four

hours. If he will not take it from the bottle, spoon or dropper, it must be given with a stomach tube. In urgent cases it may be given by the bowel by the drop method, or subcutaneously in the form of physiological salt solution. It will probably not be necessary to have recourse to these measures in this instance. The water not only prevents the loss of fluid from the tissues, thus keeping up the equilibrium of the circulation, but favors the elimination of toxic substances through the kidneys.

The duration of the period of starvation depends on the temperature, the character of the movements and the general condition of the patient. It is impossible to state in advance how long this period will be in any individual case. In all probability, not more than twenty-four or forty-eight hours in this instance.

It is wiser, on general principles, to begin feeding with some other food than milk. This is usually some form of starch or sugar. This baby is only five weeks old and ought not to have its power of digesting starch pushed too hard. A 0.75% solution of starch in the form of barley water, with 7% of milk sugar, will be suitable to begin with.

When it is time to begin milk the best milk is human milk. Nothing else compares with it in these conditions. Next to it is modified cow's milk. In general, it is wiser to begin with some combination very low in fat. The substitution of whey for some of the feedings of barley water and sugar will be a good way to begin in this instance. The addition of a small amount of skimmed milk to the barley water and sugar mixture is another way. Another is a whey mixture low in fat and relatively high in proteids, such as fat 1%, sugar 6%, whey proteids 0.75%, casein 0.25%, without lime water.

There are no drugs which can have any effect on the local condition. No stimulants are needed at present. The castor oil and irrrigation will, in all probability, relieve the distention. The temperature is not high enough or the nervous manifestations marked enough to require special treatment. The emptying of the bowels and the water diet will diminish the toxemia, and the temperature and nervous symptoms, which are caused by it, will then gradually disappear.

CASE 22. Dana B., the second child of healthy parents, was delivered at full term by low forceps and weighed eight pounds and nine ounces. He was much asphyxiated as the result of two turns of the cord about his neck, and did not breathe well until he was two days old. He was nursed, with one feeding of a mixture containing 4% of fat, 6% of sugar and 0.50% of proteids, daily, for two weeks. During this time he did not vomit, had some colic and was slightly constipated. His weight dropped to seven pounds and two ounces. He was then weaned and given a mixture of about the same strength. He did not vomit, but had several green and curdy movements daily. Two weeks later he was changed to a mixture containing 3% of fat, 3.25% of sugar and 2.50% of proteids, which he took for a week. He did not vomit, but the movements were of the same character. The next week he had a mixture containing 4% of fat, 1.10% of sugar, 0.80% of proteids and 1.10% of starch. The story was the same as before. He was finally put on a Mellin's Food mixture containing 3.70% of fat, 4% of sugar and 1.15% of proteids, which he was taking when seen in consultation, when two months old. He took ten feedings of three ounces, giving about 150 calories and 3.2 grams of proteid per kilo. He did not vomit, but was constipated. The movements, which were yellow, contained small curds and much mucus. He was taking olive oil for the constipation. He had lost seven ounces in the last week on this mixture and weighed seven pounds and two ounces, about one and one-half pounds less than at birth. He had had no fever at any time.

Physical Examination. He was small and poorly nourished, but of fair color. The fontanelle was a little depressed. The bones of the skull did not overlap. He was bright and intelligent. His mouth was healthy, his tongue clean. There was no rosary. The heart and lungs were normal. The abdomen was a little sunken, but otherwise normal. The liver was just palpable, the spleen was not palpable. The extremities were normal. There was no spasm or paralysis; the knee-jerks were not obtained; Kernig's sign was absent. There was no enlargement of the peripheral lymph nodes.

A movement which was seen was small, loose, greenish-

yellow in color, without odor, and composed mostly of mucus, with a few small, soft, green and yellow curds.

Diagnosis. The trouble in this instance is undoubtedly digestive. The absence of vomiting and the persistence of undigested movements show that the trouble is intestinal and not gastric. The absence of fever and of signs of fermentation in the movements rule out infectious diarrhea and intestinal indigestion of the fermentative type. The diagnosis is, therefore, CHRONIC INTESTINAL INDIGESTION of the type due to disturbance of equilibrium.

The cause is, of course, to be sought in the food. He was undoubtedly underfed while on the breast. While on the bottle he was somewhat overfed most of the time. The fats were no higher than most babies can digest, but were more than he was able to handle, as is shown by the small, soft curds in the movements. It was a mistake to give olive oil for the constipation, because it increased the amount of fat to be handled when the baby was already unable to take care of that in the food. It is very probable that it also increased the tendency to constipation. The proteids were at times too low to cover the proteid need, at other times much too high. There were, however, at no time any definite signs of proteid indigestion. The sugars were usually too low, but were apparently well digested.

Prognosis. Although he has lost considerable weight, his general condition is fairly good and the movements not very bad. It ought not to be very difficult, therefore, to fit the food to his digestive capacity. It will, however, probably take a good many weeks to get him to digesting properly and gaining regularly.

Treatment. The treatment consists, of course, in regulation of the diet. The best food is human milk. It is not a necessity in this instance, however, as he will almost certainly do well on suitable modifications of cow's milk. If he does not, a wet nurse can be obtained later. The history gives two fairly definite indications as to the regulation of the diet. They are to give him less food and to cut down the fat. The calories lost by cutting down the fat can be made up, if necessary, by giving more sugar, which he is able to digest.

Whey proteids are more easily digested than casein. It will be well, therefore, to start him on a whey mixture. Lime water is contra-indicated because it throws work from the stomach on to the intestine, which is the part involved. The following mixture is a suitable one:

Fat,	2.00%
Sugar,	7.00%
Whey proteids,	0.75%
Casein,	0.25%

He should have ten feedings of two and a half ounces. This gives about 120 calories and 2.3 grams of proteid per kilo.

The constipation will probably take care of itself after regulation of the diet. If not, enemata or suppositories will be better in this instance than drugs by mouth.

CASE 23. Sally B., three and one-half months old, was born at full term after a normal labor and weighed six and one-fourth pounds. She was breast-fed for ten days, when the milk gave out and she was put on modified milk. She got on very well indeed until she was two months old, when she weighed nine pounds. She then had a severe attack of influenza and was very ill for about two weeks. During her illness she lost some weight and was left much depressed generally. She had finally begun to digest well again and had a little more than regained her weight. She was taking eight feedings of three ounces of a mixture, prepared at a laboratory, supposed to contain 2.50% of fat, 5.50% of sugar, 0.50% of whey proteids and 0.25% of casein, with lime water 10% of the total quantity. It was winter and the mixture was pasteurized at 155° F.

Without any known cause she began to vomit and to have much gas and discomfort. The vomitus smelled sour. She also began to have watery, light-green movements of a sour odor, which did not contain curds or mucus, and which irritated the buttocks. She had no fever.

Physical Examination. She was fairly developed and nourished. There was moderate pallor. The anterior fontanelle was 3 cm. in diameter and slightly depressed. The tongue was slightly reddened. There was no rosary. The heart and lungs were normal. The abdomen was slightly distended, but otherwise normal. The liver was palpable 2 cm. below the costal border in the nipple line. The spleen was not palpable. The extremities were normal. There was no spasm or paralysis; the knee-jerks were equal and normal; there was no Kernig's sign. The rectal temperature was 98° F. The stools were as described above.

Diagnosis. The negative physical examination and normal temperature rule out everything outside of the digestive tract. The absence of fever, the time of year and the pasteurization of the food make a bacterial infection very improbable. The cause of the trouble must, therefore, be sought in the food. The combination of sour vomiting, flatulence and watery, green, sour, irritating stools points strongly to trouble in the digestion of the sugar. This hardly seems rea-

sonable, however, in a baby that had for months been taking from five per cent to seven per cent of milk sugar without trouble. Analysis of the food by a competent chemist showed, however, that it contained nearly ten per cent of sugar. The fat and proteid contents were reasonably accurate. The diagnosis, therefore, is ACUTE GASTRIC AND INTESTINAL INDIGESTION from an excessive amount of sugar.

Prognosis. The prognosis is good, as the cause of the trouble can easily be remedied.

Treatment. The treatment is, of course, the correction of the mistake in the preparation of the food. As this mixture gives but 86 calories and 1.3 grams of proteid per kilo, it will also be well to increase the percentage of the proteids a little.

CASE 24. Mary S., six months old, was the fourth child of healthy parents. There had been no known exposure to tuberculosis. She was born at full term after a normal labor, was normal at birth and weighed five and one-half pounds.

She was started at first on a weak mixture, copied from Dr. Holt's little book, " The Care and Feeding of Children," and did very well for a time. The gain in weight was, however, very slow, and she did not reach eight pounds until she was five months old. She had lost half a pound since then. Because of the slow gain in weight, the physician in charge rapidly strengthened the formulæ, but apparently never inquired into the details of the preparation of the food. The parents, being even more anxious than the physician to have the baby gain in weight, used gravity cream from Jersey milk instead of the 10% top milk specified in the book, and finally bought thick, pasteurized cream from a dealer. Her appetite became very poor. When she came to me, when six months old, her mother was attempting to give her eight feedings of four ounces at two and one-half hour intervals. She seldom took more than twenty ounces in the twenty-four hours, however, and this only after much urging, two and a half hours often being needed to get in two and one-half ounces. She seldom seemed hungry, but, if she did, was always satisfied with an ounce. She never vomited unless the food was forced too much. She occasionally had a little colic but always had a good deal of rumbling in the abdomen and passed much gas from the bowels. The bowels were usually constipated. The movements were small, crumbly, very light yellow, apparently well digested and without much odor. She was taking the following mixture:

Pasteurized rich cream,	5½ ounces.
Whole milk (Jersey),	2½ ounces.
Lime water,	1½ ounces.
Water,	18½ ounces.
Milk sugar,	1 dessertspoonful.

Physical Examination. She was small and thin and moderately pale. She was feeble but intelligent. The veins on the scalp were prominent. The anterior fontanelle was 3 cm. in diameter and level. The posterior fontanelle was still open.

There was no craniotabes. The throat was normal; the tongue somewhat reddened. There were no teeth. There was a marked rosary. The heart and lungs were normal. The abdomen was large, but lax. There was no dullness and no tumor was made out. The liver was palpable 3 cm. below the costal border in the nipple line. The spleen was not palpable. The extremities were normal. There was no spasm or paralysis; the knee-jerks were equal and normal; there was no Kernig's sign. There was no enlargement of the peripheral lymph nodes. Her weight was seven and one-half pounds.

Diagnosis. The physical examination justifies nothing more than the diagnosis of malnutrition with a slight and unimportant amount of rickets. The cause of the malnutrition must be sought in the history. The satiation after taking a small amount of food, taken in connection with the lack of marked symptoms of indigestion and the slow gain, suggest at once too rich a food. The small size, crumbly character and light-yellow color of the stools are very characteristic and show that they contain fat in the form of soap. The story of the substitution of gravity cream from Jersey cows for 10% top milk from ordinary cows, and later of rich bottled cream for the gravity cream, corroborates, of course, the assumption that the food was too rich in fat. It shows also how necessary it is for the physician to know exactly how the food which he orders is prepared.

The mixture which the baby was taking, if made of 10% cream and whole milk from Holstein or Ayreshire cows, as it was supposed to be, would contain about 2.40% of fat, 3.25% of sugar and 0.90% of proteids, a weak food for the age. If made of gravity cream from average milk it would have contained about 3.40% of fat. The modified milk in the bottle, however, looked like cream, and when examined was found to contain 8.8% of fat.

The diagnosis is, therefore, INDIGESTION (chiefly intestinal), malnutrition and rickets FROM AN EXCESS OF FAT IN THE FOOD. The author wishes to call particular attention to the fact that in this instance, as in almost all others of disturbed nutrition or digestion from an excess of fat in the food, the

excess was a gross one, the amount being far beyond the normal top limit of 4%.

Prognosis. The prognosis is good on a reasonable diet. The gain in weight will probably be slow, and it will be a long time before the baby will be able to take as high a percentage of fat as the average baby, as it is always difficult to develop the ability to digest fat again when it has once been seriously impaired.

Treatment. The treatment is entirely by regulation of the diet. Human milk would be the best food and would almost certainly agree, in spite of its comparatively high fat content. Next to this is some modification of cow's milk. The milk should come from Ayreshire or Holstein cows. The percentage of fat should be low because of the impaired power of digestion of fat. The caloric value can be made up by higher percentages of sugar and proteids. There is no indication for the addition of an alkali. Three ounces is as much as she ought to be expected to take at a feeding. Eight feedings, at two and a half hour intervals, will be sufficient. The following formula is a suitable one:

Fat,	2.50%
Sugar,	5.00%
Proteids,	1.25%

This gives 100 calories and 2.6 grams of proteid per kilo.

The baby should not be fed at other than the regular intervals and, if she does not take the food willingly, the attempt to make her take it should not be prolonged over half an hour. If the constipation persists it may be treated by enemata of suds or sweet oil, or by suppositories of soap, glycerin or gluten, but not by sweet oil by the mouth.

CASE 25. John B., the fifth child of healthy parents, was born at full term after a normal labor. He was normal at birth and weighed eight and three-fourths pounds. He was not nursed, but was started at once on a modified milk containing 2.50% of fat, 5.50% of sugar, 0.80% of proteids, with lime water 5% of the total quantity. He did not thrive on this and was soon put on a mixture containing 3.40% of fat, 6.50% of sugar, 1.50% of proteids and 0.75% of starch. The lime water was still 5% of the total quantity. He took this well, but was not satisfied. He did not vomit, but was constipated. The movements contained many large, tough curds, but were of good color and did not contain mucus. When four weeks old he was changed to a pancreatized mixture containing 3% of fat, 3.50% of sugar and 2% of proteids. When seen, at five months, he was still taking this mixture, getting six or seven feedings of four ounces at three-hour intervals. Seven feedings of four ounces of this mixture gives 106 calories and 4.2 grams of proteid per kilo. He was also taking two teaspoonfuls of olive oil daily. He did not vomit, but had considerable gas. The bowels did not move without laxatives. The movements were light green or yellow in color and always contained large, hard curds, but no mucus. He did not gain in weight.

Physical Examination. He was bright and happy. He was small and thin and his color was fair. The fontanelle was 3 cm. in diameter and level. The bones of the skull did not overlap. The tongue was slightly reddened; the mouth and throat were otherwise normal. There was no rosary. The heart and lungs were normal. The level of the abdomen was slightly below that of the thorax; nothing abnormal was detected in it. The liver was palpable 1 cm. below the costal border in the nipple line. The spleen was not palpable. The extremities were normal. There was no spasm or paralysis; the knee-jerks were equal and normal; there was no Kernig's sign. There was no enlargement of the peripheral lymph nodes. His weight was eight pounds and thirteen ounces.

Diagnosis. The physical examination justifies nothing more than a diagnosis of malnutrition. The slight reddening of the tongue is probably merely the result of local irritation

from the nipple, but may be a manifestation of gastric indigestion. The large, hard curds in the movements show that the casein is not properly digested. The amount of proteid in the food, 4.2 grams of proteid per kilo, is, moreover, excessive. There is nothing about the movements to show any disturbance of the digestion of either fat or sugar. The absence of vomiting, combined with the constipation and the flatulence, point to intestinal indigestion rather than to gastric. The failure to gain and the constipation suggest an insufficient supply of food. One hundred and six calories per kilo ought, theoretically, to be enough, but probably is not, as the caloric needs presumably depend somewhat on the age as well as on the weight. That is, a well baby of five months needs more calories per kilo than a fat baby of the same weight of one month. The diagnosis of malnutrition from an insufficient supply of food, and mild INTESTINAL INDIGESTION FROM AN EXCESS OF PROTEIDS IN THE FOOD is, therefore, justified.

Prognosis. The cheerfulness and the absence of marked signs of wasting show that the disturbance of nutrition is not a severe one. The disturbance of digestion is only in that of the proteids. These can be easily considerably lowered and still cover the proteid needs, while the fat and sugar can be increased to cover the caloric needs. The prognosis is, therefore, good.

Treatment. The treatment is, of course, entirely by regulation of the diet and not by the administration of drugs. Human milk, as in all the chronic disturbances of digestion or of malnutrition in infancy, is the best food. In this instance, however, it does not seem a necessity.

The caloric value of the food can best be increased by raising the percentage of sugar to 7, as the sugar is at present altogether too low. There is also no objection to giving five ounces at a feeding. After this is done it will not be necessary to increase the percentage of the fat, which is now a reasonable one. The percentage of proteids should be lowered somewhat, as the excessive amount is throwing unnecessary work on the eliminative organs, and they are not needed to keep up the caloric value of the food, which can be supplied

by the fat and sugar, which are digested. A considerable proportion of the proteids should be given in the form of whey proteids, as the large curds show that it is the casein which is not digested. An alkali is not indicated, as there is no vomiting. The following formula meets these indications:

Fat,	3.00%
Sugar,	7.00%
Whey proteids,	0.75%
Casein,	0.25%

Seven feedings of five ounces of this mixture give 159 calories and 2.6 grams of proteid per kilo.

Another method of rendering the casein more digestible is by the addition of starch to the food, which by its mechanical action prevents the formation of large curds; 0.75% of starch has as much effect as larger amounts. There is no objection to giving this amount of starch because, while it is true that the amylolytic function is only partially developed at this age, it is practically always sufficiently developed to take care of this or even somewhat larger amounts of starch without difficulty. This action of starch is, however, rather unreliable. Peptonization, or, as it should be called, pancreatization, of the food, if properly done, also usually prevents the formation of large curds. If not properly done, as was probably the case in this instance, it is ineffective.

The reddened tongue requires no treatment. Change of nipples and regulation of the diet will correct it.

The bowels may be moved, if necessary, by enemata of suds or sweet oil, suppositories of soap, gluten or glycerin, or by milk of magnesia, in doses of from one-half to one teaspoonful, once or twice daily.

CASE 26. Catherine L., six and one-half years old, was the first child of healthy parents. She was born about a month premature and for the first year had a feeble digestion and was very difficult to feed. During the first two years of her life she had repeated attacks of vomiting, some of which resembled the recurrent vomiting seen in older children. After this, however, these attacks ceased, although her diet always had to be very carefully regulated. There was always a tendency to constipation and to duodenal indigestion. She had never had any severe attacks of duodenal indigestion, however, as they could always be aborted by care in the diet and early treatment. During the last year her digestion had been much stronger than ever before. Early in June she had an attack of what was supposed to be duodenal indigestion. Recovery from this was rapid, however, and she had been perfectly well until August 21. That afternoon she went to a children's party and was a good deal excited. The food at the party was very simple and she did not over-eat. She began to vomit during the night. The vomitus contained a great deal of bile. The morning of the 22d her temperature was about 100° F. She continued to vomit bile during the day and night of the 22d, and also a little in the morning of the 23d. The vomitus continued to contain much bile. The temperature during the 22d and the morning of the 23d ranged between 100° F. and 101° F. Examination of the abdomen during the 22d showed nothing whatever abnormal. In the early morning of the 23d there was a little tenderness in the right iliac fossa, with a suggestion of spasm. There was and had been no pain in the abdomen. The bowels had been moved freely by enemata during the 22d. About noon of the 23d she had a chill and the temperature rose to 104° F., but soon began to drop again. At that time there was no pain in the abdomen, but muscular spasm and tenderness in the right iliac fossa were rather more marked. The blood count at that time showed 26,200 leucocytes.

She was then given a dose of castor oil, which during the afternoon produced a movement containing more or less mucus. She was seen in consultation at 5 P.M. on the 23d.

Physical Examination. Her face looked a little pinched,

but she was bright and happy. She was not vomiting and had no pain whatever. The pupils were equal and reacted to light and accommodation. There was no rigidity of the neck. The ears were normal. The heart and lungs showed nothing abnormal. The level of the abdomen was considerably below that of the thorax. When very deep pressure was made in the right iliac fossa she said that it hurt her a little, but gave no evidence of pain unless questioned. In fact, she smiled and talked while the abdomen was being examined. There was also very slight muscular spasm in the right iliac fossa. No tumor could be felt and there was no dullness. The abdomen was otherwise negative. The liver and spleen were not palpable or enlarged to percussion. The extremities showed nothing abnormal. There was no Kernig's sign. The knee-jerks were equal and lively. The temperature in the mouth was 101° F., and the pulse 120.

Diagnosis. The diagnosis in this case lies between tubercular meningitis, acute duodenal indigestion and appendicitis.

Tubercular meningitis should be thought of in this instance as in every illness in a child beginning with vomiting. It can be ruled out at once, however, on the absence of all signs of meningeal irritation and the presence of signs of trouble in the abdomen. The white count is also against tubercular meningitis, but does not rule it out, as there may be a leucocytosis in tubercular meningitis.

The points in favor of acute duodenal indigestion are the previous history of attacks of duodenal indigestion and of feeble digestion in the past, the typical onset of the attack with vomiting of bile, the low temperature and the slightness of the physical signs of appendicitis. The points in favor of appendicitis are the persistence of the symptoms after proper treatment for duodenal indigestion, the pinched face, the chill, the leucocytosis and the physical signs, namely, localized muscular spasm in the right lower abdomen and the slight tenderness in this region on deep pressure. The persistence of the symptoms in spite of treatment is merely suggestive of appendicitis and not inconsistent with duodenal indigestion. The chill is very suggestive of appendicitis, but chills do sometimes occur in duodenal indigestion. A leucocytosis as

high as 26,200 practically never occurs in duodenal indigestion at this age, and in connection with the chill and the physical signs is extremely important in the diagnosis. The localized muscular spasm is almost pathognomonic of appendicitis when taken in connection with the other symptoms and signs. The deep tenderness is corroborative evidence of that furnished by the muscular spasm. It might be thought that the physical signs were too indefinite to be of much importance. This is not so, however, as indefiniteness of the physical signs is characteristic of appendicitis in childhood. Finally, the previous attacks which were called duodenal indigestion may equally well have been recurrent attacks of appendicitis. The diagnosis of APPENDICITIS, therefore, seems positive.

The condition of the appendix is always problematical. In this instance it is justifiable to conclude from the good general condition, the high white count and the mildness of the physical signs that perforation has certainly not occurred and that in all probability there is but little extension of the inflammation outside of the appendix. The appendix, however, may very possibly be ulcerated and ready to perforate.

Prognosis and Treatment. The prognosis is always more uncertain in childhood than in later life because of the greater difficulty in determining the exact condition of the appendix before operation. There is no question but that an immediate operation should be done in this instance. She is in good condition to bear an operation and, since it is impossible to find out the exact condition of the appendix, it is far wiser to operate at once than to run the risk of extension of the inflammation or perforation. The prognosis with immediate operation is very good because the appendix has almost certainly not perforated and there is probably but little inflammation about it.

CASE 27. Ethel H., four years old, was the extremely nervous child of nervous parents. She had always been well except for measles and chicken-pox. She vomited a little the morning of August 6, but seemed well in every way the next day. The following day, which was extremely hot, she went to Revere Beach and ate a considerable amount of ice cream. She slept fairly well that night, but on the morning of the 9th vomited once and began to complain of pain about the navel. A physician, who was called, found the temperature 102° F. The respiration was rapid, but the lungs were normal. He gave two teaspoonfuls of castor oil and stopped all food. She had three or four loose, foul movements, which contained a little mucus, but no blood, as the result of the castor oil. The abdominal pain continued and was very severe. The temperature the morning of the 10th was 103.5° F. The bowels moved three times during that day, the movements being of the same character. The abdominal pain continued. The evening temperature was 101° F. The pulse ranged between 145 and 160, and the respiration between 40 and 80. There was no cough and the lungs remained normal. She vomited several times that night and, on account of the severe pain in the abdomen, slept but little. The temperature by rectum the morning of the 11th was 99.6° F., the pulse 140. She took no food, but drank considerable water. She vomited several times that morning. She had had a little brandy, some bismuth and chalk mixture and two doses of Castoria. She was very restless and complained constantly of pain in the abdomen. The abdomen was distended and tender from the first, the physician thought less so that morning. The physician had felt that the pain was exaggerated because of the nervous temperament of the child. She was seen in consultation at noon, August 11.

Physical Examination. She was well-developed and fairly nourished. There was moderate pallor. She was very restless, tossing from side to side and constantly crying out from pain in the abdomen. She lay on her back with the legs flexed on the abdomen; extending them caused pain. Her face looked pinched. The tongue was dry, but not coated. The heart and lungs were normal. The abdomen was only

moderately enlarged, but very tense. No localized spasm could be made out. She complained whenever the abdomen was touched, but no more so on deep than on light pressure. There was no localized tenderness. There were no signs of fluid in the abdomen. The liver and spleen were not palpable. Rectal examination showed nothing abnormal, but caused much pain. The extremities were normal. There was no spasm or paralysis. The knee-jerks and Kernig's sign could not be obtained because of the child's resistance. The rectal temperature was 101° F.; the pulse, 156. A movement, passed during the examination, consisted of a few small masses of brownish mucus.

Diagnosis. Pneumonia is suggested by the sudden onset and the comparatively greater rise in the rate of the respiration over that of the pulse. The location of the pain in the abdomen is not against pneumonia, because the pain in pneumonia in childhood is often localized in the abdomen. The abdomen is also often tense in the early stages of pneumonia in childhood. The drop in the temperature without a corresponding diminution in the rate of the respiration, the absence of cough, grunting respiration and movement of the alæ nasi, the absence of physical signs in the lungs and the pinched face are together sufficient to exclude pneumonia.

The free movements of the bowels are sufficient to rule out intestinal obstruction.

The diagnosis lies, therefore, between intestinal toxemia and appendicitis. The history of eating ice cream on a hot day is suggestive of intestinal toxemia, but is not inconsistent with appendicitis. The continuance of the symptoms in spite of catharsis and starvation is against toxemia, but does not exclude it. The character of the stools is much against toxemia. The vomiting is consistent with either condition and hence is of no importance in the differential diagnosis. Distention of the abdomen is, however, unusual in toxemia, and tenderness and pain extremely rare. These two points are sufficient in themselves to turn the scale in favor of appendicitis.

The general abdominal distention accounts for the lack of localized spasm and tenderness and suggests a beginning or

developing general peritonitis. The drop in the temperature with no improvement in the other symptoms is strong evidence that perforation has occurred and peritonitis begun. The diagnosis is, therefore, APPENDICITIS with probable perforation and beginning peritonitis.

An examination of the blood was not made in this instance and would not have helped, because a high white count is consistent with either condition. Moreover, a low white count is consistent with either depression after perforation or intense toxemia.

Prognosis and Treatment. The prognosis in this instance is practically hopeless. The only chance lies in immediate operation.

CASE 28. Nathaniel C., three years old, had always been very well and strong. There had been no indiscretion in diet. The milk supply was supposedly above reproach; his surroundings were ideal. He complained of indefinite pains in the legs and abdomen during the day of November 19, but was up and dressed. His nurse gave him some castor oil in the morning. When seen by his physician at 3 P.M. the physical examination was entirely negative; the temperature, 100.5° F. He began to have loose movements during the night, which were not carefully observed. The morning of the 20th the movements were very foul and began to contain slight streaks of blood. He did not seem really sick. The rectal temperature was 99° F. He had six movements containing blood and mucus during the day of the 20th. Part of them were foul, the others were not. He was given bismuth during the day and his bowels were irrigated in the evening. He had six more movements of the same character during the night. He had eight similar movements during the day, which were preceded and followed by pain. He had been nauseated for the first time during the afternoon, but had not vomited. He had had nothing but water during the day, but had taken a mixture of bismuth and salol with ten drops of paregoric every two hours. He was seen in consultation at 7 P.M., November 21.

Physical Examination. He was well developed and nourished and of good color. He was perfectly intelligent. The tongue was moist and but slightly coated. The heart and lungs were normal. The abdomen was sunken and negative, except that he complained of slight pain on deep pressure in the left lower quadrant. Nothing else abnormal was made out. The liver and spleen were not palpable. The extremities were normal. There was no spasm or paralysis; the knee-jerks were equal and normal; Kernig's sign and the neck sign were absent. There was no enlargement of the peripheral lymph nodes. Rectal examination showed nothing abnormal. The rectal temperature was 100° F.; the pulse, 100.

The movements were small and composed almost entirely of green mucus and blood.

Diagnosis. The continued moderate temperature and the

small movements of mucus and blood associated with pain are so charactertisic of INFECTIOUS DIARRHEA of the dysenteric type that no differential diagnosis from the other forms of diarrhea is necessary. The only other possibility, intussusception, can be ruled out on the slow onset, the absence of vomiting and the negative abdominal and rectal examinations.

Prognosis. Infectious diarrhea of this type is always a serious disease. The patient is not out of danger until he is well. It is impossible to say so early in the disease as this what course it may take. The relatively low temperature, the comparatively small number of movements, the absence of vomiting, the nearly clean tongue and the good general condition make the prognosis in this instance comparatively good. The chances at present seem to be about three out of five in favor of recovery.

Treatment. It is doubtful if he has been thoroughly cleaned out. A tablespoonful of castor oil is, therefore, indicated. It will probably be wiser to continue the starvation for twenty-four hours longer. He must, however, have a sufficient supply of water. This is, for a boy of his age, about a quart in twenty-four hours. If he will not take it by mouth, it may be given high in the bowel by the drop method. His condition at present is hardly serious enough to warrant the use of salt solution subcutaneously. It will probably be wise to begin nourishment after twenty-four hours. Milk in any form is contra-indicated. Starches, such as barley, arrowroot or rice, in the form of waters or jellies, either with or without milk sugar or malt sugar to increase their nutritive value, will be best borne. If he will not take starches in this form there is no objection to giving them in the form of crackers, zwiebach or toast. Weak mutton or chicken broth may be given, not as foods (because they are practically without nutritive value), but to induce him to take the starchy foods and as a means of introducing water. Beef juice is contra-indicated because it is so prone to decomposition by the intestinal bacteria. Albumen water is likely to produce urticaria and has but little nutritive value, the white of an egg containing but twelve calories. A few ounces of albumin water, made as it usually is with the white of one egg to eight ounces of water,

has, therefore, practically no nutritive value. It is, like beef juice, prone to decomposition by the intestinal bacteria. It is, therefore, contra-indicated.

Irrigation of the bowels once or twice in the twenty-four hours with physiological salt solution, or a 1% solution of boracic acid, is indicated to cleanse the colon. It has no direct healing action. The irrigation should be given with a soft rubber catheter, No. 25 French, passed as high as possible into the bowel, with the patient lying on the back with the hips elevated. The fluid is then allowed to run in from a bag hung not more than two feet above the level of the patient. It should be allowed to run in until the abdomen is slightly distended, then allowed to run out, and so on, until the wash water returns clean. The object of the irrigation is to cleanse the colon. Enough liquid should be used to do this, no matter whether it is much or little. Irrigation should never be done more than twice in the twenty-four hours. If it depresses or disturbs the patient much, it should be omitted, as under these conditions it does more harm than good.

Bismuth, salol and other preparations of like nature have, in the author's opinion, little or no effect on infectious diarrhea. It disturbs the patient to take them and interferes with the administration of food and water. It will be wiser, therefore, not to give them in this instance. Paregoric and other preparations of opium are, on general principles, contra-indicated in all forms of diarrhea, because their action is to diminish the number of movements by depressing peristalsis and not by relieving the cause of the increased peristalsis. The increased peristalsis is nature's effort to get rid of the poisonous intestinal contents. Nature's effort should, therefore, not be interfered with. In infectious diarrhea of the dysenteric type, however, when there is a very large number of small movements accompanied by pain and tenesmus which prevent the patient from getting proper rest, it is allowable to give opium in some form to diminish the excessive peristalsis and to quiet the patient. There is no danger, if proper care is used, of doing harm by retaining the intestinal contents too long. Paregoric, in doses of ten or fifteen drops, may be given in this instance, therefore, if necessary.

CASE 29. Pearl P., one year old, had always been well. She was fed on raw, unmodified cow's milk. She had had some slight disturbance of the bowels about the middle of July, but had almost entirely recovered. She suddenly began to vomit about noon, July 28. The vomitus consisted at first of milk, but soon became watery; it did not contain bile. Diarrhea came on in a few hours. The movements were at first fecal in character, but soon became watery and colorless. She vomited and had a movement every few minutes. Thirst became marked, but everything taken was vomited. Castor oil and calomel were also vomited. Her temperature that night was 104° F. The next morning she was much collapsed. She was seen in consultation at 9 A.M., twenty-one hours after the onset.

Physical Examination. She had evidently lost much weight. Her skin was dry and her extremities cold and blue. The fontanelle was much depressed. Her eyes were wide open and staring, but she took very little notice. The pupils were equal and reacted to light. Her tongue was dry. She held her head rigidly backward. The heart and lungs were normal. The abdomen was much sunken but not rigid. Neither liver nor spleen were palpable. She tossed her arms about constantly. Her legs were somewhat rigid; the knee-jerks were equal and exaggerated; Kernig's sign could not be determined because of the rigidity. The rectal temperature was 104° F., the pulse 160, and the respiration 60. The vomitus and movements looked like turbid water.

Diagnosis. The history and physical examination are so typical of CHOLERA INFANTUM that there is no need of considering any other disease. The nervous symptoms are due to a combination of toxemia and loss of fluid.

Prognosis. The prognosis is very grave. There is probably not more than one chance in twenty of recovery. The disease is, however, to a certain extent, self-limited. If she lives through the next thirty-six hours the chances of recovery will be very much better.

Treatment. The main indications for treatment in this condition are (1) to empty the stomach and bowels of their toxic contents; (2) to supply fluid to the tissues which are

being so seriously drained; (3) to restore the surface circulation; (4) to reduce the temperature; (5) to keep the patient alive until the disease has run its course.

Nature is already doing her best to empty the stomach and bowels. Nothing can be done to help her. Cathartics will be vomited and stomach washing and irrigation of the bowels will only increase the collapse. There is no objection, however, to giving the baby cool water to drink, even if it is vomited, as it will make her more comfortable and help to wash out the stomach.

The only way in which fluid can be supplied to the tissues is by the administration of physiological salt solution subcutaneously. She should be given from four to eight ounces at a time, repeated every three or four hours if absorbed.

The surface circulation is best restored by the application of heat externally in the form of heaters or hot packs. She should be at once surrounded with heaters and, if this is not successful, be put in a pack at 100° F., or a little higher. Restoration of the surface circulation will usually reduce the internal temperature. If it does not, irrigation of the colon with water at 90° F. will usually do so. Her temperature is hardly high enough to require this at present.

It is useless to give stimulants or other drugs by the mouth, as they will not be retained. All drugs must, therefore, be given subcutaneously. The best stimulant is caffein. This may be given subcutaneously in the form of caffeine-sodium benzoate. The dose for this baby is one quarter of a grain every three or four hours. Strychnia, in doses of 1-500 of a grain, may also be given subcutaneously, if necessary. Alcohol is contra-indicated. Adrenalin is indicated if the cardiac failure increases. Unfortunately it has very little action when given subcutaneously, and intravenous injection is very difficult in a baby of this age. If the restlessness increases, morphia, in doses of 1-100 of a grain, given subcutaneously, will aid by quieting her and saving her strength.

Food of any description is contra-indicated until the vomiting and diarrhea have stopped. The first food given should be a 1% solution of starch in the form of barley water, with 5% of milk sugar added.

SECTION III.

DISEASES OF NUTRITION.

CASE 30. Cynthia M., the first child of healthy parents, was born at full term after a normal labor, and weighed ten and one-fourth pounds. The breast-milk gave out after two weeks and she was put on a rather strong modification of milk, on which, nevertheless, she did fairly well. She began to vomit when two months old and the gain in weight became very slow, but the movements remained normal. When four months old she was put on a home modified milk which contained about 2% of fat, 9.60% of sugar, 0.75% of whey proteids and 0.40% of casein. She had seven feedings of six ounces. She vomited less while taking this mixture, but continued to regurgitate. She had one normal movement daily, but her weight remained stationary. She had some colic. The sugar in the mixture was reduced to 6% and the vomiting and colic became less. When five months old, as she did not gain, she was changed to a home modified mixture which contained about 1.80% of fat, 10% of sugar, 0.90% of proteids and 0.50% of starch. She took seven feedings of six ounces. She was not at all satisfied, vomited less than before and had very little colic, but was somewhat constipated. The movements were normal in character. She held her weight the first week, but lost half a pound the second week. She was then seen, when six months old. She slept well, had plenty of fresh air and did not act sick.

Physical Examination. She was fairly developed and nourished. Her color was good. She was a little flabby. The fontanelle was level. The mouth was healthy and the tongue clean. She had one tooth. There was a very slight rosary. The heart and lungs were normal. The level of the abdomen was that of the thorax, and nothing abnormal was detected in it. The liver was palpable 1 cm. below the costal

border in the nipple line. The spleen was not palpable. The extremities were normal. There was no spasm or paralysis; the knee-jerks were equal and normal; Kernig's sign was absent. There was no enlargement of the peripheral lymph nodes. She weighed thirteen pounds.

The movement was yellow and salve-like in consistency, except in one place where it was a little granular and brittle. The odor was slight. The reaction was alkaline (presumably from the relatively large amount of proteid in relation to the fat). Microscopically it showed no undigested fat, starch or casein.

Diagnosis. The physical examination shows nothing abnormal except flabbiness and a slight rosary. The former is, of course, merely a sign of malnutrition. The rosary means rickets, but when it is slight and the only bony sign of the disease, as in this instance, the rickets is of practically no importance and need not be considered. The very slight amount of the vomiting and the normal movements show that there can be no disturbance of digestion sufficient to account for the loss of weight. The evident hunger and the tendency to constipation point strongly to an insufficient supply of food as the cause. Whether this is so or not can, of course, be determined practically by giving more food and awaiting the result. Proceeding in this way, however, there is no guide as to how much more food should be given. It is far better to calculate the caloric value of the food and thus know the truth at once, and, if the baby is under-fed, know how much so, and also how much more food to give.

A baby of six months requires, on the average, about 100 calories per kilo daily in order to thrive and gain. This baby weighs 5.9 kilos and, therefore, needs about 600 calories daily. It is not a difficult matter to calculate the caloric value of the food. Forty-two ounces equals 1,260 ccm.; 1.8% of fat equals 1.8 grams of fat in 100 ccm. of food, or 22.6 grams in 1,260 ccm. The caloric value of 1 gram of fat is 9.3 calories. The caloric value of the fat in the food is, therefore, 210 calories. The caloric value of proteid, sugar and starch being the same, 4.1 calories per gram, they can be calculated together. Figuring in the same way as for the fat,

they together furnish 129 calories. The total value of the food is, then, 339 calories or 57 calories per kilo, only a little more than half the caloric needs.

A baby must not only get a certain number of calories daily in its food, but it must also get at least 1.5 grams of proteid per kilo in order to thrive. It will gradually fail and die if the proteids are insufficient, even if the food contains a sufficient number of calories. This baby's food contained 0.9% of proteid or 11.3 grams in the 42 ounces. This is equal to 1.9 grams of proteid per kilo and amply covers the proteid needs. This ample supply of proteids explains her good general condition and the fact that she has not appeared sick.

The diagnosis is, therefore, MALNUTRITION FROM AN INSUFFICIENT SUPPLY OF FOOD. The knowledge that the caloric value of the food is insufficient also enables us to rule out infantile atrophy, a condition in which there is a progressive loss of weight, while the caloric value of the food is normal and there are no symptoms of indigestion.

Prognosis. The prognosis is, of course, perfectly good if the caloric value of the food is increased. There seems to be no reason why it cannot be in this instance as the stools show that all the components of the food are digested.

Treatment. The best food for infants, whether sick or well, is human milk. A wet nurse is, therefore, the best treatment for this patient. A wet nurse is not necessary in this instance, however, as the baby can undoubtedly be easily fed on some modification of cow's milk.

Past experience shows that it will not be wise to give this baby over six per cent of sugar. It is advisable to keep the fat down when babies vomit. It will, therefore, be wise to keep the percentage of fat as low as is consistent with meeting the caloric needs. There is no objection to giving a reasonably high percentage of proteids, as the baby has already shown her ability to digest them. It will be wise to continue the starch in the mixture, since the examination of the stools shows that the baby can digest it and it adds to the caloric value of the food. Six feedings of five and one-half ounces each ought to be about right for her age and weight.

The following formula meets these indications and covers both the caloric and proteid needs:

Fat,	2.50%
Sugar,	6.00%
Proteids,	1.50%
Starch,	0.75%

Six feedings of $5\frac{1}{2}$ ounces give 565 calories, or 96 calories per kilo, and 14.8 grams of proteid, or 2.5 grams of proteid per kilo.

Approximately the same mixture can be prepared at home as follows:

Gravity cream (16%),	5 ounces
Skimmed milk,	10 ounces
Barley water (1.50% starch),	18 ounces
Milk sugar,	2 rounded and 1 level tablespoonful

Two teaspoonfuls of barley flour to a pint of water makes a 1.50% starch solution. One rounded tablespoonful of milk sugar is equal to about half an ounce.

No drugs are indicated.

CASE 31. David W., was born at full term and was the only child of healthy parents. There was no history of tuberculosis in the family and no known exposure to it. He weighed nine pounds at birth, but fell to six pounds in the first three weeks, and when seen in consultation at eleven months weighed but ten pounds. He had always been fed on milk, prepared in various ways. During the first month the mixture had been sterilized. This apparently upset the baby and caused considerable constipation. A little later he was given one part of whole milk to three of water, but as the movements contained curds, the strength was reduced to one part of whole milk to six of water. As he still passed curds, he was given a condensed milk mixture, containing one part of condensed milk to twelve of water. As he did not gain and continued to have curds in the stools, he was given a modified milk mixture prepared at a laboratory. He was at first given straight proteids of one per cent; later, part of the proteids were given in the form of whey proteids. He did better on this, but the movements still contained curds. This was stopped after a few months and he was put on condensed milk again. As he did not gain, he was put back on modified milk. During the last month he had been taking six feedings of $5\frac{1}{2}$ ounces of a mixture containing 2.75% of fat, 6.00% of sugar and 0.25% of proteids, but was not gaining.

He had been constipated during all this time, except for two short attacks of diarrhea a month or two before he was seen. He had always taken his food well and had almost never vomited. The movements had always been fairly well digested, except that they at times contained a few curds. He was a quiet baby and almost never fussed.

Physical Examination. He was small and poorly nourished. Pallor was marked. The skin was somewhat dry. The anterior fontanelle was 2 cm. in diameter, the level being somewhat below that of the surrounding bones. He had two lower incisors. There was no rosary. The heart and lungs were normal. The level of the abdomen was below that of the thorax; it was lax, easily palpable and showed nothing abnormal. The liver was palpable 2 cm. below the costal border in the nipple line; the spleen was not palpable. The

extremities showed nothing abnormal. There was no spasm or paralysis; the knee-jerks were equal and normal. There was a slight general enlargement of the superficial lymph nodes. The weight was ten and one-half pounds.

Diagnosis. The examination shows nothing except malnutrition. It gives no clue as to its cause. This must be sought in the history. In general, the causes of malnutrition which give no physical signs beyond those of malnutrition are congenital syphilis, chronic diffuse tuberculosis, infantile atrophy, chronic indigestion and starvation.

Disturbance of nutrition is the main symptom in some cases of congenital syphilis. The good family history, the absence of any other signs of syphilis and the presence of other causes for the malnutrition rule it out in this instance. The slight general enlargement of the superficial lymph nodes does not point either to syphilis or tuberculosis. It is common to all disturbances of nutrition in infancy and is, consequently, of no diagnostic value. Chronic diffuse tuberculosis, meaning by this term the condition in which there are numerous tubercular foci scattered throughout the body, larger and older than the miliary tubercle, but not large enough or so situated as to give physical signs, is not very infrequent in infancy. It cannot be recognized on physical examination, but only by the tuberculin test. It cannot be ruled out in this instance, but is less probable than some other conditions. The symptoms of indigestion are not sufficient to account for the malnutrition.

Barring chronic diffuse tuberculosis, which can only be positively excluded by a tuberculin test, the diagnosis lies, therefore, between infantile atrophy and starvation. The term, "infantile atrophy," should be limited to those cases in which there is a progressive loss of weight in spite of a sufficient intake of food, there being at the same time no symptoms of disturbance of the digestion. In this class of cases there is presumably some obscure disturbance of absorption or metabolism. Clinically they form a very definite group. It is probable, however, that, with the increase of our knowledge of chemical pathology, they will, in the future, be classified in some other way.

While he was taking the condensed milk and whole milk mixtures he was unquestionably not getting enough calories, but in the last mixture he got 105 calories per kilo, or just about enough to cover his caloric needs. A baby cannot thrive, however, even if the food contains a sufficient number of calories, if it does not also contain proteids enough to cover the proteid needs. The condensed milk and whole milk mixtures contained, respectively, 0.66%, 0.87% and 0.50% of proteids, which were probably not quite enough to meet the proteid needs. His last mixture gave but 0.5 grams of proteid per kilo, while he needed at least 1.5 grams of proteid per kilo. The diagnosis of infantile atrophy is, therefore, not justified because, while he is getting a sufficient number of calories, he is not getting enough proteid, and the condition is best called MALNUTRITION FROM AN INSUFFICIENT AMOUNT OF PROTEID IN THE FOOD. If he does not begin to gain weight when the proteid is increased enough to cover his proteid needs, the diagnosis will have to be changed to infantile atrophy, which has probably developed as the result of the continued insufficient supply of proteids.

Prognosis. The prognosis must be held in abeyance until the effect of an increase in the proteids is known. If he begins to gain when they are increased, the prognosis is good; if he does not, it is very grave unless he is given human milk. If he gets this he will probably recover, because babies with atrophy can usually utilize the proteids of human milk even if they cannot those of cow's milk.

Treatment. The treatment consists in the regulation of the food. Human milk is altogether the best food for him. It will almost certainly cure him whether the condition is proteid starvation or atrophy. If he cannot get this, the next best thing is some modification of cow's milk. He is digesting the present mixture, which, however, does not contain enough proteid. The natural thing to do, therefore, is to leave the percentages of fat and sugar unchanged and to increase the proteids to 0.75% in order to cover his proteid needs, keeping the number and amount of the feedings the same. There is no indication for medicinal treatment.

CASE 32. George T. was the only child of healthy parents. He was born two months before he was expected. He had never been nursed, but had been fed on whole cow's milk, more or less diluted with water. He had never done well. He vomited at times directly after feeding, but never between feedings. His bowels were constipated; the movements were smooth. His head sweat a great deal. He was fussy and slept poorly. He was brought to the hospital when eleven months old.

Physical Examination. He was small and thin, weighing but nine pounds. Pallor was marked. He could hold up his head, but was unable to sit alone. When supported he sat with a marked general kyphosis. This disappeared when he lay on his face. The frontal and parietal eminences were so much enlarged that the top of the head showed a depression between them both longitudinally and across.. The anterior fontanelle was 5 cm. in diameter and depressed. There was no craniotabes. The pupils were equal and reacted to light. There were no teeth. The mouth and throat were normal. There was a marked rosary and there was a depression around the lower part of the chest at the level of the insertion of the diaphragm, with moderate flaring of the ribs below. The heart and lungs were normal. The liver was palpable 3 cm. below the costal border in the nipple line; the spleen was not palpable. The extremities showed nothing abnormal except a moderate enlargement of the epiphyses at the wrists and ankles. There was no spasm or paralysis; the knee-jerks were equal and normal. There was a moderate general enlargement of the peripheral lymph nodes. There was no eruption.

The urine was pale, slightly acid, of a specific gravity of 1,010 and contained no albumin.

BLOOD.

Hemoglobin,	25%
Red corpuscles,	2,566,000
White corpuscles,	15,000
Small mononuclears,	62%
Large mononuclears,	3%
Polynuclear neutrophiles,	34%
Eosinophiles,	1%

There was moderate variation in the size, but none in the shape or staining reaction, of the red corpuscles. No nucleated forms were seen.

Diagnosis. The diagnosis is, of course, RICKETS and SECONDARY ANEMIA. The enlargement of the frontal and

FIG. 4. GEORGE T. CASE 32.

parietal eminences with the resultant "square" head, the rosary and the enlargement of the epiphyses at the wrists and ankles are pathognomonic of rickets. The weakness of the back, the large anterior fontanelle, the absence of teeth and the deformity of the chest are, in this instance, undoubtedly also signs of rickets, but are not pathognomonic, as they may be caused by other conditions.

The rachitic enlargement of the head, so well shown in this baby, is not infrequently mistaken for hydrocephalus. There should not, however, be any difficulty in distinguishing between them. The enlargement of the rachitic head is due to the overgrowth of bone on the outside; that of the hydrocephalic head to increased pressure on the inside. The rachitic head is asymmetrical and flattened on top; the hydrocephalic, symmetrical and rounded. In the former the fontanelle is level or sunken; in the latter, bulging. In rickets the eyes appear normal; in hydrocephalus, they are prominent. These differences are well shown in the accompanying photographs.

The kyphosis seen in this instance is often mistaken for the

deformity of Pott's disease. The diagnosis between them is, however, a simple one. The deformity in rickets is due to muscular weakness, is a general rounded curve, involving the whole spine, and disappears on extension. That in Pott's disease is due to deformity of the bone, is a local angular protuberance, involving only part of the spine, and does not disappear on extension. This curve is well shown in the accompanying photograph of a baby of about the same age as the patient.

The blood picture is that of a secondary anemia of a moderate grade. The percentage of hemoglobin is relatively lower than the number of red corpuscles. This "chlorotic" type

FIG. 5. CURVE OF WEAKNESS. CASE 32.

of blood is characteristic of the secondary anemias of infancy. The white count is so little above the normal that it can hardly be called a leucocytosis, especially as the differential count of the white cells is normal for this age. The anemia should not be regarded as a symptom of the rickets, but merely as another manifestation of the same disturbance of nutrition which caused the rickets.

Prognosis. The prognosis as to life is good. The activity of the rachitic process will quickly cease under proper treatment, but the bony deformities will still remain. The rosary and enlargement of the epiphyses will disappear in a year or two. The deformity of the chest will probably never entirely disappear, and his head will probably always be a little large

and peculiarly shaped, but not enough so to attract any attention.

Treatment. The treatment is hygienic and dietetic, not medicinal. He should be given the maximum amount of fresh air and sunlight and especially protected against all sorts of contagion.

There are no special indications as to the regulation of his diet, except that he has not done well on the combination of low fat and sugar with high proteids, which he has had in the past. A reasonable mixture for him is:

Fat,	3.50%
Sugar,	7.00%
Proteids,	1.50%
Starch,	0.75%

An alkali is not indicated in this instance as there has been no disturbance of the gastric digestion. Six feedings of six ounces is sufficient for his weight. If the constipation continues on this mixture, he may have from one-half to two tablespoonfuls of orange juice daily.

The saccharated carbonate of iron in three-grain doses, or ferratin in two-grain doses, will help the anemia. The author has not seen any better results when cod-liver oil and phosphorus have been given in addition to regulation of the diet and hygienic surroundings than when they have not, and consequently seldom prescribes them.

CASE 33. Pauline P. was born July 15 at full term after an instrumental labor, was normal at birth and weighed eight pounds. Her father learned, about July 1, that he had pulmonary tuberculosis and went West about two weeks after she was born. She was put at once on modified milk and did very well. About October 1, when ten weeks old, she went West and joined her father. He slept out of doors and was very careful not to expose her to infection. After going West she was fed on equal parts of whole milk and water, prepared with Mellin's Food. This did not agree with her very well. She returned to her home in the East, February 1, having been with her father about four months. She was then put on a mixture of whole milk and water, prepared with "Peptogenic Milk Powder." In the course of the preparation of the food, the milk was brought to a boil. She had been taking this food for three and one-half months when she was seen. She had taken and digested it well and gained steadily in weight.

She stopped creeping about April 20. April 26 she fell out of a low chair to the floor, striking on her forehead. She did not seem hurt, except for a bruise on the right side of the forehead. Beginning with the next day she cried a great deal during her bath, and May 1 it was noticed that motions of the legs caused pain. The pain on motion of the legs increased. She lay on her back and kept her legs drawn up. When quiet in this position she had no pain. She was very much afraid of being touched and began to cry when any one approached her. The upper gums became inflamed about May 10. Her appetite had fallen off and she had lost some weight and much color since the appearance of the pain, although she had shown no signs of indigestion. Her temperature had not been taken, but she had not appeared feverish. The urine had not stained the diapers. She was seen in consultation May 17, when ten months old.

Physical Examination. She was fairly developed and nourished and moderately pale. She was very much afraid of being touched. The fontanelle was level. There was an ecchymosis, about the size of a five-cent piece, on the right side of the forehead. The two lower central incisors had

erupted and the gum was normal about them. The upper gum was distended by the four incisors. The gum was a little purplish over them. The tongue was clean and the throat normal. There was a slight rosary. The heart, lungs and abdomen were normal. The liver was palpable 2 cm. below the costal border in the nipple line; the spleen was not palpable. The spine was perfectly flexible. She preferred to lie on her back with the legs flexed at the hips and knees. Neither active nor passive motions were limited, but motions at the hips and knees caused much pain. There was no definite tenderness and no swelling about the bones or joints. The arms were not tender and were used freely without discomfort. The knee-jerks were equal and normal; Kernig's sign was absent; sensation to touch and pain was normal. There was no enlargement of the peripheral lymph nodes. The rectal temperature was 98.6° F.

Diagnosis. Tuberculosis of the spine or hip-joints had been seriously considered by the physician in charge because of the known exposure to tuberculosis. The normal mobility of the spine and at the hips, together with the normal temperature, rule this out. The grandmother thought that the fall might be the cause of the pain. The baby had, however, stopped creeping before the fall and showed no evidence of injury at the time. It is hard to conceive, moreover, of an injury which would involve both legs and not show any physical signs. Infantile paralysis and multiple neuritis might be thought of on account of the pain. Infantile paralysis can be at once excluded because of the absence of paralysis and the presence of normal reflexes after three weeks. Multiple neuritis can be ruled out because at this age it is almost always a sequela of diphtheria and, consequently, is seldom accompanied by pain. The reflexes are intact, moreover, and there is no paralysis or disturbance of sensation. Osteomyelitis and periosteitis seldom occur in more than one place at a time and can be excluded on the good general condition and the absence of fever and localized tenderness. The combination of pain without physical signs is characteristic of rheumatism in early life. Rheumatism almost never occurs in early infancy, however, and will not account for the swollen

and purplish gum. The slow onset, the unwillingness to use the legs, the pain on motion and the position in which the legs are held are almost pathognomonic of SCURVY and justify that diagnosis without any other evidence. The combination of these signs with the swollen, purplish gum, another characteristic sign of scurvy, cannot be accounted for in any other way, and makes the diagnosis absolute. The ecchymosis on the forehead may be a scorbutic manifestation but, on the other hand, may be simply the result of the fall. The prolonged use of boiled milk is corroborative evidence of the diagnosis of scurvy, as it is undoubtedly one of the causes of this disease.

Prognosis. The prognosis is absolutely good. She will be perfectly well in a week if properly treated.

Treatment. The first step in the treatment is to remove the probable cause of the disease, that is, boiling the milk. There seems to be no reason for changing the composition of the food as she was doing very well on it except for the scurvy. The mixture contains 2% of fat, 6.50% of sugar and 1.75% of proteids. It is always unwise to continue peptonization over long periods because it tends to weaken the digestive power. It will, therefore, be wise to replace the " Peptogenic Milk Powder " (which is composed largely of milk sugar) by milk sugar and to add starch, in the form of barley water, to hinder the formation of large curds. The following combination is a suitable one:

Whole milk,	24 ounces
Barley water (1.50% starch),	24 ounces
Milk sugar,	4 rounded tablespoonfuls

This mixture contains 2% of fat, 6.50% of sugar, 1.75% of proteids and 0.75% of starch. The sugar should be mixed with the hot barley water and the mixture cooled before the milk is added. She should take six feedings, of from seven to eight ounces.

She will undoubtedly recover in time on the " fresh " food, but recovery will be slow. Fruit juices, however, have a specific action in infantile scurvy, and should, therefore, always be given. They will cure the process even if the cause is not removed. Orange juice is the best, because it is the

most readily taken. Babies seldom object to it. It may be given plain or diluted with water. There is no objection to the addition of cane sugar if the orange is sour. It may be given all at one dose or divided into two doses. It is best given about an hour before a feeding, when the stomach is empty. One ounce is the proper dose. Less than this may be ineffectual, more is unnecessary. She should have, therefore, an ounce of orange juice daily. This dose should be continued until all symptoms of the disease have disappeared. It will be wise to keep it up for some time longer, but the dose need not be as large.

CASE 34. Laliah P. was the first child of healthy parents. She was born at full term and weighed six and one-half pounds. She had always been fed on pasteurized milk prepared at a laboratory. She had done very well until she was six months old, when she ceased to gain and lost her appetite. When she was seven months old her mother noticed that the urine at times stained the diapers red. This staining was attributed by the physician in charge to uric acid. It continued intermittently for a month, when the urine was examined and found to contain fresh blood, but no casts. Micturition was not increased in frequency and was not painful. There were no other symptoms whatever except failure to gain in weight. She was seen in consultation when eight months old.

Physical Examination. She was well developed and nourished, but somewhat pale and flabby. She was bright and happy. The anterior fontanelle was 3 cm. in diameter and level. The mouth and throat were normal. There were no teeth. There was no rosary. The heart and lungs were normal. The level of the abdomen was somewhat above that of the thorax; it was everywhere tympanitic and nothing abnormal could be detected. Very careful examination failed to find any enlargement of the kidneys. The liver was palpable 2 cm. below the costal border in the nipple line; the spleen was not palpable. The extremities were normal. There was no spasm, paralysis or tenderness. Neither active nor passive motions caused pain. The knee-jerks were equal and normal; Kernig's sign was absent. There was a slight general enlargement of the peripheral lymph nodes. She weighed thirteen pounds.

The urine was pale with a slightly reddish tinge, feebly acid, of a specific gravity of 1,006 and contained a trace of albumin. The sediment showed a few red blood corpuscles and an occasional leucocyte, but no other formed elements.

Diagnosis. The only causes of hematuria, not associated with bleeding elsewhere, in infancy, which really deserve consideration are irritation from crystals of uric acid, sarcoma of the kidney and scurvy. Tuberculosis of the kidney is almost unheard of at this age, and, when present, the urine

more often contains pus than blood. Vesical calculi are also very unusual at this age and rarely cause hematuria at any age unless the patient is very active. Irritation from uric acid crystals can be ruled out in this instance on the examination of the urine. The absence of frequent and painful micturition also make it improbable. The hematuria is perfectly consistent with either sarcoma of the kidney or scurvy. Pain is rare in sarcoma at this age, and constitutional symptoms are usually absent until the tumor has attained considerable size. Hematuria appears before the tumor is palpable in about forty per cent of the cases. Hematuria is not infrequently the earliest symptom of scurvy, appearing before pain and tenderness in the extremities or sponginess of the gums. An absolute diagnosis between sarcoma and scurvy in this instance is, therefore, impossible. The chances are very much in favor of scurvy, however, because of the much greater frequency of scurvy than of sarcoma of the kidney, the long continuance of the pasteurization of the milk, which predisposes to the development of scurvy, and the loss of appetite and failure to gain in weight, which usually precede and are almost invariably associated with scurvy. The chances are, in fact, so much in favor of SCURVY that it is justifiable to make a positive diagnosis of this disease and to consider sarcoma as merely an extremely remote possibility.

Prognosis. The prognosis is perfectly good. The bleeding will almost certainly cease within a week under proper treatment.

Treatment. The treatment is simple. It consists in stopping the pasteurization of the milk and in giving an ounce of orange juice daily. If it is inadvisable in any instance to omit pasteurization because of an unreliable supply of milk or hot weather, orange juice alone will cure the trouble.

CASE 35. Margaret M. was the ninth child of healthy parents. All the others, except one that had died at birth, were alive. There was no history of tuberculosis in the family and no known exposure to tuberculosis.

She was born at full term and was breast-fed for three weeks, since when she had been fed on condensed milk. The movements had always been green and loose. She had, however, taken her food well, had not vomited and had gained fairly well in weight. She began to vomit about the middle of July and a week later began to have from five to seven movements daily. These were watery, green or yellow in color, had a foul odor and contained a few small curds and considerable mucus. Blood was noticed once. She was admitted to the Children's Hospital August 7, when three months old. Her temperature was then 104° F., but, as the result of treatment, dropped to normal the next day, where it remained, except for a rise of temperature lasting two days a few days later.

Physical Examination at entrance. She was poorly developed and much emaciated. There was moderate pallor. The mouth and tongue were red and dry. The anterior fontanelle was $3\frac{1}{2}$ cm. in diameter and depressed. The bones of the skull overlapped a little. There was no rosary. The heart and lungs showed nothing abnormal. The abdomen was sunken, but otherwise negative. The liver was palpable 3 cm. below the costal border in the nipple line. The spleen was not palpable. The extremities showed nothing abnormal. The knee-jerks were not obtained. The cervical lymph nodes were slightly enlarged. A few dysentery bacilli were found in the stools.

Under careful treatment and feeding the vomiting and number of movements diminished and their character steadily improved, so that on August 17 she was having two pasty, yellow movements daily. She took her food well and did not vomit. At that time she was taking twelve feedings of two ounces of a mixture containing 2% of fat, 5% of sugar, 0.25% of whey proteids and 0.25% of casein. Her weight, however, had fallen from five pounds and fourteen ounces to five pounds and eight ounces. Her general condition was, if

anything, worse than a few days before. The amount of food was increased to two and one-half ounces on the 18th, while the fats were increased to 2.50% and the sugar to 6% on the 19th. She took her food well and did not vomit, but continued to have from two to four perfectly normal movements daily. In spite of this, however, she continued to lose about one ounce daily, so that on the 21st she weighed but five pounds and four ounces.

Diagnosis. The physical examination shows nothing abnormal except the signs of malnutrition. It gives no clew as to its cause. The striking thing in the history is the progressive loss of weight without any symptoms of indigestion or fever. The trouble is undoubtedly a recent one and the result of the mild attack of infectious diarrhea, since the baby had previously done fairly well. The only two conditions which need to be considered are starvation and infantile atrophy. The food taken August 17 gave 115 calories and 1.4 grams of proteid per kilo, and that taken August 19, 160 calories and 1.6 grams of proteid per kilo, more than enough to cover both the caloric and proteid needs. Starvation can, therefore, be ruled out. The picture corresponds exactly to the definition of INFANTILE ATROPHY, a condition in which there is a progressive loss of weight in spite of a sufficient intake of food, there being at the same time no symptoms of disturbance of the digestion.

Prognosis. The prognosis is practically hopeless unless the baby can get human milk. The chances are not very good if she can, because there is a strong probability that the disturbance of metabolism has gone so far that she will not be able to utilize even human milk.

Treatment. The only treatment which offers any reasonable chance of recovery is human milk. She must have it at any cost. There is no other food which is worthy of consideration in this instance. There is nothing to be hoped from medicinal treatment.

SECTION IV.

SPECIFIC INFECTIOUS DISEASES.

CASE 36. Bessie F. was born November 21, 1894. She was seen in consultation May 10, 1900. Both her parents had died of pulmonary tuberculosis during the previous year. She had lived with them up to the time of their death. One brother, six years old, was well. There had been no other children.

She had measles when two years old and was said to have had influenza in February, 1900. She began to complain of pain in the abdomen about the first of March, 1900. The pain continued for several weeks and then ceased. Swelling of the abdomen was noticed about the middle of March and had slowly but steadily increased. Her appetite was good. She vomited after breakfast, however, two or three times a week. Her diet was a reasonable one for her age. Her bowels moved once in two or three days. The character of the movements had not been noted. She had had a cough during the day for about a month. She had lost both flesh and color.

Physical Examination. She was well-developed and fairly nourished, but somewhat pale. She was bright and happy. Her tongue was moist and moderately coated. The heart was normal. There was slight dullness in both backs below the eighth space, with normal but somewhat diminished respiration and voice sounds. Fine, crackling, moist râles were occasionally heard in the dull area. The upper border of the liver flatness in the nipple line was in the fourth space. The lower border of flatness was 3 cm. above the costal border. The splenic dullness could not be determined. The edge of the spleen was not felt. The abdomen was much enlarged and the walls were tense. The distention was uniform. There was no enlargement of the superficial abdominal veins. There was dullness in the lower portion and in both flanks.

While the child lay on her back the upper line of dullness was concave. The rest of the abdomen was tympanitic. The area of dullness changed with change of position. A fluid wave was present. There was no edema of the extremities or of the face. There was no enlargement of the superficial lymph nodes. The rectal temperature was 99° F.; the pulse, 120. The urine showed nothing abnormal; the blood was not examined.

Diagnosis. The principal abnormality observed in the physical examination is the presence of fluid in the abdominal cavity. Both borders of the liver are higher than they should be, while the total width of the liver flatness is normal, showing that the liver is merely displaced upward by the pressure of the fluid in the abdomen. The absence of the splenic dullness is presumably due to its displacement upward and backward. The râles show that the dullness and diminished respiration and voice sounds in the lower backs are not due to fluid in the pleural cavities. They are satisfactorily explained by the displacement of the liver upward and the consequent compression and congestion of the lower portions of the lungs. This condition also explains the cough.

The dullness in the flanks, the concavity of the upper border of the dullness, when she lies on her back, and the change of the area of dullness with change of position prove that the fluid is free in the abdomen and not confined in an ovarian or other cyst.

Free fluid in the abdominal cavity may be due to causes either within or without the cavity. When due to causes outside of the abdominal cavity, there is usually edema of other parts of the body and, if the trouble is in the heart, the signs of passive congestion in other organs. The absence of edema and of the signs of passive congestion and the normal condition of the heart and urine rule out all causes outside of the abdomen in this instance.

The possible causes located within the abdomen are those diseases and conditions which result in portal congestion and diseases of the peritoneum. The two causes of portal congestion are disease of the liver and compression of the portal vein. The absence of enlargement of the spleen and of the

superficial abdominal veins makes portal congestion very improbable. The normal size of the liver practically excludes disease of this organ. The age of the child is also much against any chronic disease of the liver. The absence of an alcoholic or syphilitic history and of all signs of syphilis, the two most common causes of chronic disease of the liver at this age, makes disease of the liver still more improbable. Compression of the portal vein is usually due to a new growth of some sort, usually enlarged lymph nodes, they, in turn, usually being tubercular. In the light of the prolonged exposure to tuberculosis, a tubercular infection of the abdominal lymph nodes is not at all unreasonable in this instance and cannot be excluded on the negative physical examination, because an enlarged lymph node, too small to be palpable, can, if located in the right place, exert much pressure on the portal vein. As already explained, however, the absence of enlargement of the spleen and of the superficial abdominal veins makes portal congestion very improbable.

The diseases of the peritoneum to be considered are chronic serous peritonitis, malignant disease of the peritoneum and tubercular peritonitis. There is much doubt as to whether there is such a disease as chronic serous peritonitis. If there is, it almost never occurs before puberty. Malignant disease of the peritoneum is extremely rare, almost always results in palpable tumors and is accompanied by greater cachexia than is present in this instance. Both of these conditions can be excluded, therefore, if any other more reasonable explanation can be found. Tubercular peritonitis of the ascitic form is not at all uncommon at this age; the onset and progress of the illness in this instance are most characteristic of this disease; the prolonged exposure to tuberculosis makes a tubercular infection very probable. The diagnosis of TUBERCULAR PERITONITIS seems, therefore, amply justified.

An examination of the ascitic fluid will aid materially in confirming the diagnosis. The fluid from portal congestion is a transudation; that from disease of the peritoneum, an exudation. In the former the specific gravity of the fluid is below 1,015 and it usually contains less than 2% of albumin, while in the latter, the specific gravity is above 1,015 and it

usually contains more than 4% of albumin. The cells in a transudation are usually few and endothelial in character. The fluid in tubercular peritonitis usually contains many cells, and these are largely lymphocytes. Characteristic tumor cells are not infrequently found in the fluid when there is malignant disease of the peritoneum. Tubercle bacilli may often be found in the fluid in tubercular peritonitis, and animal inoculations are almost always positive. The diagnosis of tubercular peritonitis is, however, justified in this instance without an examination of the fluid.

A skin tuberculin test would be of interest in this child, but not of great aid in diagnosis. If positive, it merely shows that the child has a tubercular focus somewhere, not that the trouble in the abdomen is tubercular, although it is, of course, important corroborative evidence. If negative, it does not prove that the trouble in the abdomen is not tubercular, because the test is often negative when the tuberculosis is of the miliary type, as it is in this instance.

Prognosis. Favorable points in this instance are the unusually good general condition, the absence of fever and of evidences of tuberculosis elsewhere. Her chances of recovery are probably about even, provided she can have proper treatment.

Treatment. The author does not believe in a routine operative treatment in this disease, even in the ascitic form, and does not think that, on the whole, the cases that are operated on do any better than those that are not. He believes in leaving the fluid alone unless it is causing too much discomfort or doing harm by the compression of other organs. He then believes in tapping rather than in opening the abdomen, leaving the latter as the last resort when the abdomen fills up rapidly after tapping. The treatment as regards the ascites is, therefore, in this instance, expectant. The further treatment is that of tuberculosis in general: an out-of-door life, day and night; quiet and forced feeding. There is no indication for drugs.

CASE 37. Mary D., seven years old, was the child of healthy parents. Three other children were well and one had died at birth. There was no tuberculosis in the family and no known exposure to tuberculosis.

She was born at full term after a normal labor. She was nursed for eight months and did very well. During her fourth year she had had diphtheria, measles, whooping-cough and chicken pox, and was not in very good health during the next year. Since then she had been very well indeed.

She was taken suddenly sick July 30 with a pain in the abdomen, but did not go to bed. The next day she vomited everything she took except water, and the pain continued. The pain and vomiting were worse on August 1 and she stayed in bed most of that day. She vomited the morning of August 2, but had no pain. She had no pain and did not vomit on the 3d and 4th, but stayed in bed. The bowels had moved regularly; the character of the movements was not known. She entered the Children's Hospital August 5.

Physical Examination. She was well developed and nourished. She lay comfortably in bed and did not look acutely sick. The pupils were equal and reacted to light and accommodation. There was no rigidity of the neck. There was moderate pallor of the skin and mucous membranes. The tongue was moist and covered with a thin white coat. The throat was normal. The heart and lungs showed nothing abnormal. The liver flatness extended from the upper border of the sixth rib to the costal margin; the edge was not felt. The upper border of splenic dullness was in the eighth space; the edge was not felt. The abdomen was full and the walls were held rigidly. Examination was difficult, deep palpation being impossible. There were no rose spots. An indefinite mass was felt above the symphysis pubis, extending one half way to the umbilicus. This mass was still present after the bladder had been emptied by catheterization. There was also an indefinite resistance just above the right iliac crest. There was dullness in this region and over the mass in the hypogastrium. There was no shifting dullness and no fluid wave. There was slight general tenderness throughout the abdomen. The extremities showed nothing abnormal. There

was no spasm or paralysis. The knee-jerks were not obtained. The plantar reflexes were normal. There was no edema. There was slight enlargement of the cervical lymph nodes. Rectal examination showed nothing abnormal. The temperature was 102° F.; the pulse, 94; the respiration, 25.

Urine (drawn by catheter): Normal color, acid, 1,018, no albumin or sugar. The sediment contained a few leucocytes and a few fine granular and hyaline casts.

Blood: Leucocytes, 13,700.

Diagnosis. The points which are of value in the differential diagnosis in this instance are an acute abdominal affection of five days' duration; the good general condition; a definite tumor in the hypogastrium when the bladder is empty; an indefinite resistance and dullness above the right iliac crest; the negative rectal examination; and the slight degree of the leucocytosis.

The only diseases which are really worthy of consideration are appendicitis, some disease of the female pelvic organs and tubercular peritonitis. The urine shows merely a mild degenerative nephritis, which is of no importance either in diagnosis or in prognosis. The fever is consistent with all of these diseases and is, therefore, of no aid in the differential diagnosis.

The history is much more suggestive of appendicitis than of the other conditions. Against it are the good general condition in spite of the tumor in the abdomen, the location of the tumor, the presence of another indefinite mass, the negative rectal examination and the slight degree of the leucocytosis.

The location of the tumor is consistent with some inflammatory process in the female pelvic organs. Against this diagnosis are the extreme rarity of inflammatory processes in these organs at this age, the location of the other indefinite mass, the negative rectal examination (which at this age amounts to a vaginal examination), and the slight degree of the leucocytosis.

In favor of tubercular peritonitis is the presence of two masses, presumably due to the same cause, which do not correspond to the findings in any other condition and which

are consistent with the lesions found in tubercular peritonitis. The fact that these masses cannot be felt on rectal examination is not inconsistent with the location of the tumors in tubercular peritonitis, but is with that of the tumors of appendicitis and inflammatory processes in the pelvic organs. The slight degree of the leucocytosis is also consistent with tubercular peritonitis. The absence of a family history of or exposure to tuberculosis and the acuteness of the onset may be urged against the diagnosis of tubercular peritonitis. A tubercular family history is, however, of little or no importance either for or against tuberculosis unless there has been exposure. The absence of a history of exposure to tuberculosis does not count in any way against tuberculosis, although, of course, a history of exposure points strongly toward it. The history of measles and whooping-cough in the past, both of which are known to predispose to the development of tuberculosis, is of some importance in this instance. An onset as acute as in this instance is unusual, but not uncommon enough to count much against the diagnosis of tubercular peritonitis. The good general condition is more consistent with this disease than with the others under consideration. The diagnosis of TUBERCULAR PERITONITIS is, therefore, justified. It is undoubtedly of the caseous or fibrocaseous type.

Prognosis. The prognosis in this type of tubercular peritonitis is not nearly as good as in the ascitic form. She probably has about one chance in three of recovery.

Treatment. Operation cannot possibly do any good in this instance. The masses are too extensive to be removed, and opening the abdomen cannot of itself be of any benefit. The further treatment is that of tuberculosis in general; an out-of-door life day and night, quiet and forced feeding. There is no indication for drugs.

CASE 38. George G., three years old, was the child of healthy parents. One other child was well and one had died of cerebrospinal meningitis "caused by a fall." There had been no miscarriages. There was no tuberculosis in the family and no known exposure to tuberculosis. He had always been perfectly well.

It was noticed on September 4 that his appetite was poor and that he seemed dull, sleepy and tired. He continued in this condition, although up and about the house, until September 10, when he went to bed. He vomited in the night and the next day seemed decidedly worse and began to complain of pain in the abdomen. That night he became restless, threw his head back on the pillow and "kicked out with his feet." He also became very cross and irritable. The irritability continued, but he remained conscious. He vomited again on September 12. The bowels were constipated from the beginning, moving only with enemata. The pain in the abdomen continued. He made no complaint of headache. Strabismus appeared on September 14 and persisted. That night he began to cry out as if in pain. This symptom continued. He was admitted to the Children's Hospital September 16.

Physical Examination. He was fairly well developed and nourished, but looked sick. He was dull mentally but conscious. He could not speak plainly, but was able to make his wants known. He was irritable and cried out occasionally as if in pain. There was double convergent strabismus. He was able to see. The pupils were dilated and equal, but did not react to light. There was no discharge from the nose or ears. The lips were red and cracked. The tongue was dry and covered with a moderate brown coat. The tonsils were slightly reddened and prominent. There was no herpes. The heart and lungs showed nothing abnormal. The level of the abdomen was below that of the thorax; there was no definite muscular spasm; it was tympanitic and not tender; no masses were made out. The upper border of the liver flatness was at the upper border of the fifth rib; the edge was palpable 3 cm. below the costal border in the nipple line. The spleen was not palpable. There were no rose spots or

petechiæ. The head was not held backward, but there was slight rigidity of the neck and complete flexion was resisted and caused pain. There was no spasm or paralysis of the extremities. The knee-jerks were normal and equal. Kernig's and Babinski's signs were absent. There was no ankle clonus. Sensation to pain was normal. There was no enlargement of the peripheral lymph nodes. The rectal temperature was 102° F., the pulse 110 (normal is 100), the respiration 30. The urine was high-colored, strongly acid, of a specific gravity of 1,026, and contained neither albumin nor sugar. The blood showed 23,000 leucocytes.

Diagnosis. The early history suggests nothing more than a disturbance of digestion. The completed history points strongly to meningitis, although typhoid with symptoms of meningeal irritation is a possibility. The strabismus, the dilated and reactionless pupils, the slight rigidity of the neck and the pain on motion, the absence of enlargement of the spleen and of rose spots and the leucocytosis are sufficient, when taken together, to positively rule out typhoid. The absence of retraction of the head and of marked rigidity of the neck, of spasm or paralysis of the extremities and of Kernig's and Babinski's signs, as well as of changes in the knee-jerks, is somewhat unusual, but not enough so to count materially against meningitis. The relatively low pulse is consistent with either condition. The diagnosis of meningitis is, therefore, certain.

The diagnosis of meningitis, however, is not sufficient. It is necessary to go further and to determine the kind of meningitis. When meningitis does not develop in the course of some other acute disease it is practically invariably either tubercular or cerebrospinal, and other types do not need to be considered. The diagnosis in this instance, therefore, lies between the tubercular and cerebrospinal forms. The diagnosis between tubercular and cerebrospinal meningitis in infancy and early childhood is often a very difficult one, because most of the points which help in the diagnosis in later childhood are so uncertain at this age that little dependence can be placed upon them. In most cases, however, a very probable diagnosis can be made.

In this instance the absence of a tubercular family history and of exposure to tuberculosis does not count at all against tubercular meningitis or in favor of cerebrospinal meningitis. The slow onset is in favor of the tubercular form, but does not, by any means, rule out the cerebrospinal. The absence of herpes and eruptions does not count against the cerebrospinal form or in favor of the tubercular, because herpes and eruptions are very unusual in cerebrospinal meningitis at this age. Retraction of the head, marked rigidity of the neck, spasm and paralysis of the extremities, Kernig's and Babinski's signs, and changes in the pupils may be absent in both, but are more often wanting in the tubercular form. The leucocytosis is in favor of cerebrospinal meningitis, but is not inconsistent with the tubercular form, in which a leucocytosis sometimes occurs. The weight of the evidence is, therefore, somewhat in favor of TUBERCULAR MENINGITIS, enough so, in fact, to justify this diagnosis. There is, however, a reasonable possibility that the trouble really is cerebrospinal meningitis. The only way in which an absolute diagnosis can be made is by lumbar puncture. Since lumbar puncture is a harmless procedure, and since cerebrospinal meningitis can in most instances be cured by the antimeningitis serum, a lumbar puncture should be done at once in order that he may have the advantage of the serum treatment if the disease is cerebrospinal meningitis instead of tubercular meningitis, as it seems.

The normal cerebrospinal fluid is perfectly clear, like distilled water, does not form a fibrin clot on standing, and never contains more than 0.1% of albumin, or more than twenty cells per cubic millimeter. The vast majority of these cells are mononuclear. The fluid in tubercular meningitis is usually slightly turbid, sometimes clear, rarely very turbid or purulent, forms a fibrin clot on standing and contains more than 0.1% of albumin and more than twenty cells per cubic millimeter. The vast majority of these cells are mononuclear, usually lymphocytes, the percentage varying from 80 to 98. The proportion of polynuclear cells usually increases with the progress of the disease. Tubercle bacilli can be found in the fluid in about ninety per cent of the cases, if the examination

is careful enough. If the examination is hasty, they will usually be missed. A fluid should never be passed as normal because it appears clear when drawn. If a fibrin clot does not form in twenty-four hours, tubercular meningitis can be excluded. The fluid in cerebrospinal meningitis is usually markedly turbid, often purulent, sometimes nearly clear, forms a fibrin clot or a sediment of pus on standing, contains more than 0.1% of albumin and several hundred cells per cubic millimeter. The vast majority of these cells are polynuclear, the percentage usually varying between 75 and 90. The percentage of mononuclear cells gradually increases and finally exceeds the polynuclear in cases which recover. The meningococcus is almost invariably present in the acute stage. Under normal conditions the cerebrospinal fluid flows out slowly, drop by drop, while in both forms of meningitis it usually, but not always, flows out more rapidly or even spurts out.

The fluid obtained by lumbar puncture in this instance was slightly cloudy, showed a definite fibrin clot in six hours, and contained one hundred and twenty-five cells to the cubic millimeter, 83% of which were lymphocytes. No organisms were seen in the examination of one cover slip. The diagnosis of tubercular meningitis is, therefore, verified by the results of the lumbar puncture.

Prognosis. It is true that there are a few instances on record of recovery from tubercular meningitis. These are, however, so few in comparison with the vast number of fatal cases that it is not justifiable to give anything but an absolutely hopeless prognosis.

Treatment. There is no curative treatment for tubercular meningitis. Repeated lumbar punctures will, however, often relieve headache and other symptoms of increased cerebral pressure, such as convulsions and twitching. It has no effect on the progress of the disease, and is not indicated at present in this instance. In spite of the hopeless prognosis, he must be nursed and fed as if he were certain to get well. If he will not swallow, he must be fed with a tube. Further treatment must be symptomatic.

CASE 39. Girdham D., three years old, took rather a long walk with his mother the afternoon of December 27, which was a very cold and windy day. He had sausages for supper, which was not an unusual occurrence, and went to bed apparently perfectly well. He vomited several times during the latter part of the night. A physician who saw him the next morning found nothing abnormal on physical examination. He cleaned him out with castor oil, gave him bicarbonate of soda and limited his diet to broth and albumin water. He did not vomit any more, had a comfortable day and slept well the night of the 28th. He was a little stupid all day on the 29th, but from time to time complained of headache. In the afternoon the physician found that his neck was a little stiff and that his pulse was irregular. The bowels had not moved during the day. He was seen in consultation at 6 P.M.

Physical Examination. He was well developed and nourished and of good color. He was somewhat stuporous but, when roused, was rational, although irritable. Passive movements of the neck were a little limited and caused some pain. The neck sign was absent. The membranæ tympanorum showed nothing abnormal. The pupils were equal and reacted to light. There was no enlargement of the cervical lymph nodes. The tongue was moderately coated, the throat normal. The heart was normal, except that it was somewhat irregular in force and rhythm. The lungs and abdomen showed nothing abnormal. The liver and spleen were not palpable. The extremities were normal. There was no spasm or paralysis; the knee-jerks were equal and normal; Kernig's and Babinski's signs were absent; there was no contralateral reflex. The rectal temperature was 101° F., the pulse 140.

Diagnosis. The only conditions to be considered in this instance are intestinal toxemia and meningitis. The appearance of the symptoms of disturbed digestion immediately after the taking of improper food, following over-exertion and exposure to cold, make toxemia the more probable. The only things which really suggest meningitis are the persistence of the symptoms after catharsis and limitation of the diet and

the slight rigidity of the neck. Disturbances of digestion and toxemia not infrequently persist, however, after catharsis and starvation, and symptoms of meningeal irritation are not at all uncommon in intestinal toxemia. The slightly stuporous condition, the irritability and the irregularity of the pulse are consistent with either condition. The absence of all physical signs of meningeal irritation, except the slight rigidity of the neck, is strongly against meningitis, but does not exclude it, because these symptoms are not infrequently lacking for several days, or even longer, after the onset. The chances seem very much in favor of intestinal toxemia, but there is enough to suggest meningitis to justify a lumbar puncture for diagnosis. This is a harmless procedure and, now that cerebrospinal meningitis can usually be cured by the antimeningitis serum, if it is administered early, should be done in every case in which there is a reasonable probability of meningitis. The sudden onset and rather rapid development of the stuporous condition suggest cerebrospinal rather than tubercular meningitis, but they are not inconsistent with the tubercular form at this age.

The fluid obtained by lumbar puncture was under high pressure and very turbid. A large fibrin clot formed on standing. The fluid contained 2,600 cells per cubic millimeter. So many of the cells were broken down that a differential count was impossible. There was, however, undoubtedly a large excess of polynuclear cells. Numerous Gram-decolorizing diplococci were seen within the cells. (See Case 38 for description of the normal cerebrospinal fluid and of the fluid in meningitis.) The results of the examination of the fluid obtained by lumbar puncture justify, of course, an absolute diagnosis of CEREBROSPINAL MENINGITIS.

Prognosis. The chances for recovery, if he is treated with the antimeningitis serum, are better than even, because it is less than forty-eight hours since the onset, the symptoms are comparatively mild and the organisms are all within the cells. This latter point shows that nature is making a fairly successful struggle against the infection.

Treatment. Another lumbar puncture must be performed as soon as the antimeningitis serum can be secured. All the

fluid that will run out must be allowed to escape. An equal amount of serum must then be introduced through the same needle, provided that 30 ccm. or more has run out. If less than that has been obtained, 30 ccm. must still be given, unless undue resistance is met in giving this amount. This, or a larger dose, according to the amount of fluid which escapes, must be repeated daily until no micro-organisms can be found in smears made from the fluid. If the temperature remains much elevated or the symptoms are not improving, the serum treatment must be continued even if the organisms have disappeared. Far better results are obtained from good-sized doses, frequently repeated, in the beginning, than from smaller doses or from the same or larger doses at longer intervals. Rigidity of the neck alone is not an indication for the continuance of the treatment, since rigidity often persists well into convalescence. No other treatment, except regulation of the bowels and of the diet, is indicated in this instance.

CASE 40. Timothy D., twelve years old, was the child of healthy parents. An uncle had died of pulmonary tuberculosis a year before. He had not lived with him, but had seen him repeatedly. He had always been well, except for an illness " similar to the present " a year before.

He began to be dizzy about August 26, but had no other symptoms except constipation. He was first seen by his physician September 2. The physical examination and the urine then showed nothing abnormal. His bowels were thoroughly cleaned out, but the dizziness persisted. September 6 he began to complain of stiffness in the neck and held his head turned to the right. Passive motions were, however, but little limited and did not cause pain. The pupils were equal and reacted to light. The knee-jerks were equal and normal. Kernig's and Babinski's signs were absent. The neck was stiffer September 8 and he began to complain of pain in the neck. The pulse also became slow, running between 56 and 64. He began to vomit on the 9th and the rigidity and pain in the neck became much worse. The highest temperature up to the morning of the 9th was 99° F.; that morning it was 100° F. The constipation had persisted. He was seen in consultation at 4 P.M., September 9.

Physical Examination. He was well developed and nourished and of good color. He was perfectly conscious, but cried out occasionally from pain in the back of the neck. There was no retraction of the neck, but he held his head rigidly and turned to the right. All motions of the neck caused much pain. The neck sign could not be tested because of the rigidity. There was no enlargement of the cervical lymph nodes. The tongue was moderately coated; the throat normal. The pupils were equal and reacted both to light and accommodation. There was no strabismus. The membranæ tympanorum showed nothing abnormal. The heart and lungs were normal. The liver and spleen were not palpable. The abdomen was sunken, but not rigid. There was no spasm or paralysis of the extremities. The knee-jerks were equal and not exaggerated. The cremasteric and abdominal reflexes were present and not unusually lively. There was a marked Kernig's sign on both sides. Babinski's

sign was absent and there was no clonus. There was no disturbance of sensation. There was no eruption. The tâches cerebrales were marked. The mouth temperature was 100° F., the pulse 60.

Diagnosis. There can be no doubt, of course, that he has meningitis. The only question is whether it is tubercular or cerebrospinal. The known exposure to tuberculosis and the slow onset point strongly toward the tubercular form. There is nothing in the physical examination which is not consistent with either type. The absence of eruptions does not count at all against cerebrospinal meningitis since eruptions are far more often absent than present in this disease in childhood. It may be remarked in passing that the tâches cerebrales are of no importance in the diagnosis of meningitis, as they are present in all sorts of conditions in childhood. It is also worthy of mention that the abdomen, while often sunken from the lack of food, is almost never rigid in meningitis. In spite of the fact that the disease is almost certainly tubercular, a lumbar puncture should be done to make the diagnosis certain, because the fact that he has been exposed to tuberculosis does not prove that he has contracted it, and because the onset of cerebrospinal meningitis is sometimes slow and, if it is cerebrospinal meningitis, the serum treatment may save him.

A lumbar puncture was done at once and 45 ccm. of very turbid fluid under moderate pressure was allowed to run out. The marked turbidity of the fluid points very strongly to cerebrospinal meningitis (see Case 38 for description of the cerebrospinal fluid in health and disease), and much overbalances the points previously mentioned in favor of tubercular meningitis. It justifies a probable diagnosis of CEREBROSPINAL MENINGITIS and makes it obligatory to treat him on this basis without waiting for the results of the examination of the fluid.

Treatment. He should be given 45 ccm. of antimeningitis serum, which is equal to the amount of fluid withdrawn, through the same needle without withdrawing it. It is unwise to wait for the examination of the fluid, because the symptoms are marked and the earlier the serum is given the

more likely he is to recover. The serum can do no harm if the disease proves to be tubercular and, if it is cerebrospinal, considerable time is saved by not waiting for the examination. If the examination of the cerebrospinal fluid shows that the trouble really is cerebrospinal meningitis, this, or a larger dose, according to the amount of fluid which escapes, must be repeated daily until no micro-organisms can be found in smears made from the fluid. If the temperature remains much elevated or the symptoms are not improving, the serum treatment must be continued even if the organisms have disappeared. Rigidity of the neck alone is, however, not an indication for the continuance of the treatment, since rigidity not infrequently persists well into convalescence. The withdrawal of the fluid will probably relieve the headache. If it does not, an ice cap will probably help it.

The fluid which was withdrawn showed a small deposit of pus and a fibrin clot. Ninety-nine per cent of the cells were polynuclear and the diplococcus intracellularis was found both within and without the cells, thus verifying the diagnosis of cerebrospinal meningitis.

Prognosis. The prognosis in this instance is somewhat against recovery, because of the long duration of the illness before the beginning of treatment. The slow onset and the low temperature are, however, points in his favor.

CASE 41. Simon R., seven years old, was taken suddenly sick on the night of March 6 with pain in his head and moderate fever. He vomited several times during the first twenty-four hours, but not afterward. His bowels were opened freely with calomel the next day and had moved daily since then. The movements were loose, but otherwise normal. He had had no cough or nose-bleed. The pain in the head continued and the temperature gradually rose to 105° F. He was seen in consultation March 10.

Physical Examination. He was slight but muscular. His color was good. There was no eruption. He complained of pain all over his head, but of nothing else. He was perfectly rational. The pupils were equal and reacted to both light and accommodation. There was no strabismus or facial paralysis. The ear-drums were normal. The throat showed nothing abnormal. The tongue was dry and moderately coated. There was no tenderness or rigidity of the neck. The heart was normal. Percussion of the lungs showed nothing abnormal. The respiratory murmur and voice sounds were slightly diminished in the lower right back, but not changed in character. The level of the abdomen was below that of the thorax. The walls were lax and palpation was easy. There was no muscular spasm and no tenderness. The liver was not palpable. The upper border of the splenic dulness was on the eighth rib. The spleen was not palpable. There was no spasm or paralysis of the extremities. The knee-jerks were lively and equal. Kernig's and Babinski's signs were absent. Sensation to touch was normal. The cervical lymph nodes were slightly enlarged. The temperature by mouth was 105° F., the pulse 110, the respiration 28.

Diagnosis. Several diseases which it would have been necessary to consider at first, because of the acute onset, can now be ruled out on the duration of the illness and the absence of their typical symptoms and physical signs after four days. These are acute indigestion, malaria, scarlet fever, tonsillitis and otitis media. The other diseases which are suggested by the history are pneumonia, meningitis (more probably cerebrospinal than tubercular) and influenza.

The acute onset with vomiting and the continued high

temperature are very characteristic of pneumonia; the headache is not inconsistent with this diagnosis. Cough, while often absent for one or two days, almost always develops, however, by the fourth day. The physical signs in the lungs, namely, localized diminution of the respiratory murmur and voice sounds, are rather characteristic of pneumonia in an early stage and are often all that can be found for several days. Something more definite would, however, be expected by the fourth day. The pulse is slower than would be expected with a temperature of 105° F. in pneumonia, and the rate of the respiration is not increased out of proportion to that of the pulse. This latter point is an extremely important one and, when taken in connection with the indefiniteness of the symptoms and physical signs, is sufficient to rule out pneumonia.

The acute onset, the persistence of the headache and the relatively slow pulse and respiration suggest meningitis. The clear mind and the absence of all signs of meningeal irritation make it, however, extremely improbable. It is certainly not probable enough to justify a lumbar puncture for diagnosis.

The history and lack of physical signs are consistent with influenza. The duration of the illness without the development of any catarrhal symptoms, the relatively slight prostration and the comparatively slow pulse are, however, against it. Influenza seems a more reasonable diagnosis than the others, but is far from being satisfactory.

Is there any other disease which will explain the symptoms and physical signs better? There is, and that disease is typhoid fever. An acute onset is not unusual in typhoid in children. Nose-bleed is relatively infrequent at this age. A diffuse headache is characteristic of this disease. The spleen is enlarged (the normal upper limit of dullness is at the ninth rib). The relatively slow pulse (the normal rate at seven years is 90), without any symptoms of increased cerebral pressure or meningeal irritation, is almost pathognomonic. It is too early for rose spots, and abdominal symptoms are as often absent as present in typhoid at this age. A probable diagnosis of TYPHOID FEVER seems, therefore, justified.

There are several laboratory tests which may be tried

which will aid more or less in the diagnosis. Typhoid fever has no leucocytosis; neither has influenza. A white count will be, therefore, of no assistance in differentiating between these two diseases. A low white count will, in this instance, practically rule out pneumonia and cerebrospinal meningitis. Pneumonia, meningitis and typhoid all show the diazo-reaction; influenza does not. This test might, therefore, be of some assistance in differentiating between typhoid and influenza. It is too early to expect a positive Widal reaction, and it is hardly worth while to try it at present. A blood culture will almost certainly settle the diagnosis at once, as they are positive in about ninety per cent of all cases of typhoid at this stage.

Prognosis. The prognosis of typhoid fever at this age is very good. He is in good condition and his prognosis is at least as good as the average. The duration of the fever will probably not be over three weeks. There is very little chance of hemorrhage, practically none of perforation.

Treatment. He must, of course, be kept in bed. The author does not believe in a strict milk diet in this disease. It does not provide enough calories, is very monotonous and tends to cause constipation. He is very sure that patients who are fed more liberally are in better condition at the end of the disease and that they convalesce more rapidly. Broths and beef tea have almost no nutritive value, are likely to stir up peristalsis, and should consequently be given but sparingly. A suitable diet for this boy is as follows:

Milk, broth, beef tea, barley jelly, rice jelly, farina, milk toast, blanc mange, baked custard, junket, ice cream.

His fever will probably not require much treatment. If his temperature is constantly over 104° F., or he is depressed, or shows symptoms of disturbance of the nervous system as the result of the fever, it will require treatment. Sponge baths of alcohol and water, equal parts, at 90° F., every four hours, will probably be sufficient to control it. An ice-cap for the headache and suds enemata for constipation, if present, are all that are necessary at present in addition to regulation of the diet and baths.

CASE 42. Althea P., five and one-half months old, was the only child of healthy parents and had always been perfectly well. There had been no miscarriages. Her father had had a severe " cold " in his throat and nose about two weeks before. She had had a " cold in the nose " for a week, but had not appeared sick or feverish. She had taken the breast well up to the last two days. The discharge had irritated the upper lip a little. There had been no other symptoms.

Physical Examination. She was well developed and nourished and of good color. The anterior fontanelle was 3 cm. in diameter and level. She showed a slight tendency to keep her mouth open. There was a small amount of thin, watery discharge from the nose which irritated the upper lip. The turbinates were a little swollen and reddened and had a few crusts on them. No membrane was seen. The throat was perfectly normal. There was no rosary. The heart and lungs were normal. The level of the abdomen was that of the thorax. It showed nothing abnormal. The liver was palpable 2 cm. below the costal border in the nipple line. The spleen was not palpable. The extremities were normal. There was no spasm or paralysis. The knee-jerks were equal and normal. Kernig's and Babinski's signs were absent. There was no enlargement of the peripheral lymph nodes The rectal temperature was 99.2° F.

Diagnosis. Syphilitic rhinitis can be at once excluded on the good family history, the previous good health, the good general condition, the history of exposure to her father's " cold " and the absence of all other signs of syphilis. The only thing to suggest diphtheritic rhinitis is the persistence of a watery discharge which irritates the upper lip. The absence of constitutional symptoms, fever and enlargement of the cervical lymph nodes does not count at all against diphtheritic rhinitis, because a persistent, irritating, nasal discharge without other symptoms is most characteristic of this disease in infancy. The chances are, of course, much in favor of a simple rhinitis, but the watery, irritating character of the discharge is suspicious enough to demand a bacteriological examination. This was made and an almost pure culture of the Klebs-Loeffler bacillus was found, justifying

the suspicion of DIPHTHERITIC RHINITIS. The presumption is that her father had had diphtheria and that she had caught it from him.

Prognosis. The prognosis is perfectly good. Extension of the process is very unusual, even if it is untreated. The chief danger is of infection of those about her.

Treatment. The treatment is the administration of the antitoxin of diphtheria. Fifteen hundred units, repeated in two days, will probably be sufficient; more must be given if the discharge persists. Local treatment is hardly necessary, but some simple alkaline solution, dropped in the nose with a medicine dropper, every few hours, will probably make her more comfortable. She must be isolated until two consecutive negative cultures have been obtained from both the nose and throat.

CASE 43. Martin S., six years old, began to have a loud, ringing cough with slight difficulty in breathing during the night of May 23. The cough and difficult respiration continued without diminution during the 24th. That night the difficulty in respiration increased considerably, so that he slept but little. He was no better on the morning of the 25th and was not able to talk aloud. During the day the difficulty in breathing increased very rapidly, so that he had to sit up to breathe. He became cyanotic and was unable to take nourishment. His temperature during these days had ranged from normal to 101° F. Repeated examinations of the throat had shown nothing abnormal. He was seen in consultation at 7.30 P.M., May 25.

Physical Examination. He was a large, strong boy. He was markedly cyanotic and was sitting up in bed with his head stretched forward. The inspiration was noisy. The cough was harsh and dry. He was unable to speak above a whisper. The cervical lymph nodes were slightly enlarged. The tonsils were moderately enlarged and somewhat reddened, but there was no exudation upon them. There was no nasal discharge. There was sinking in of the supraclavicular spaces, of the lower intercostal spaces and of the epigastrium with each inspiration. Percussion of the lungs was normal. The respiratory murmur was very feeble, but not abnormal in character. Very many loud, dry and coarse, moist râles were heard over both chests. The râles were alike in both chests and both behind and in front. There was nothing abnormal about the heart except the rapidity of its action. The abdomen was normal. The liver and spleen were not palpable. The extremities were not examined. The axillary temperature was 101° F., the pulse 150, the respiration 24.

Diagnosis. The cyanosis and the retraction of the epigastrium, intercostal and supraclavicular spaces are simply manifestations of some obstruction to the entrance of air into the lungs and do not indicate where the obstruction is located. The head is stretched forward in order to make breathing easier by straightening the upper air passages. The normal condition of the nose and throat rules out obstruction above the larynx. The signs in the lungs are not

sufficient to account for so much cyanosis and retraction. The fact that the râles are alike in both chests, both back and front, shows, moreover, that they are not made in the bronchi, but transmitted from above. The relatively low rate of the respiration also shows that the trouble in the lungs is not the cause of the cyanosis and retraction. The obstruction must, therefore, be situated in the larynx. The noisy inspiration, the harsh dry cough and the whispering are all characteristic of inflammation of the larynx and corroborative of the diagnosis of laryngeal obstruction.

The next point to be determined is whether the trouble in the larynx is catarrhal or diphtheritic. The progressive increase in the difficulty in respiration is almost pathognomonic of laryngeal diphtheria and entirely different from the course of catarrhal laryngitis, in which the obstruction is not continuous and progressive, but occurs in paroxysms, being worse at night than during the day. The progressive increase in the symptoms is of itself sufficient to justify the diagnosis of LARYNGEAL DIPHTHERIA. The slight degree of the fever is consistent with either condition, but is more characteristic of laryngeal diphtheria than of catarrhal laryngitis, in which the temperature is usually higher. The absence of marked inflammation of the throat and of enlargement of the cervical lymph nodes does not count at all against laryngeal diphtheria because in primary laryngeal diphtheria the throat is usually not involved and, as there is but little absorption from the larynx, the lymph nodes are not enlarged. It would be criminal, in this instance, to await bacteriological verification of the diagnosis. A negative culture, if taken from the throat, would not, in fact, invalidate the diagnosis of laryngeal diphtheria, because the diphtheria bacilli are often absent from the throat when the diphtheritic process begins in the larynx.

Prognosis. The prognosis is practically hopeless without intubation, and very grave with intubation unless antitoxin is given freely. With intubation and antitoxin the chances are in his favor, because he is in good general condition, there is no involvement of the throat, practically no septic absorption and his heart is strong.

Treatment. Intubation should be done at once. He should be given six thousand units of antitoxin as soon as he has quieted down after the intubation. This dose should be repeated in eight hours. It is impossible to state in advance whether he will need more or not. If his temperature drops to normal and the general condition remains good, it will probably not be necessary to repeat it. If he coughs up the tube and the obstruction does not return, further doses will not be needed; otherwise, the antitoxin must be continued, perhaps in larger doses. The tube should be removed on the third or fourth day. If the obstruction recurs it must be replaced. It is far wiser to have some one competent to remove and replace the tube in the house as long as the tube is in the larynx than to leave him alone, because emergencies, such as blocking of the tube and coughing up the tube, are liable to occur at any time and, if not met immediately, are likely to prove fatal.

The food should be milk and soft solids, like junket, baked custard, ice cream, soft cereals and soft toast. Some children take liquids better; some, soft solids. It is impossible to tell in advance which he will take better. Most children take their food best sitting up. It is wiser, therefore, to try him first in this position. If he has trouble in taking it in this way he may be able to take it better lying on his back with his head lower than his body. If he has much difficulty in taking food, it is safer to feed him with a tube introduced through the mouth than to persist with other methods. No other treatment is indicated at present.

CASE 44. Isabelle C., eight years old, had had measles but not scarlet fever. She had been perfectly well during the last six months. She slept well the night of November 16, ate her usual breakfast, had a normal movement of the bowels and went to school apparently in good health. Soon after reaching school she began to have a rather severe headache, but said nothing about it. When her father went after her at noon, he found her very feverish and having a chill. She was a little nauseated, complained of headache and was very nervous and excited. She was seen at 3 P.M.

Physical Examination. She was well developed and nourished and in good general condition. She was very nervous and much excited. She complained of feeling cold and of headache. The headache was general, not localized. She was generally hyperesthetic. There was no rigidity or tenderness of the neck. The pupils were equal and reacted to light. The throat was normal. The tongue was slightly coated. The membranæ tympanorum were normal. The heart and lungs were normal. The liver and spleen were not palpable. The level of the abdomen was that of the thorax; nothing abnormal could be detected in it. There was no spasm or paralysis. The knee-jerks were equal and normal; Kernig's and Babinski's as well as the neck sign were absent. There was no enlargement of the peripheral lymph nodes and no eruption. The temperature, by mouth, was 102.8° F., the pulse 120, the respiration 35.

The urine was high in color, acid in reaction, of a specific gravity of 1,024, and contained no albumin or sugar.

The leucocytes numbered 8,100. No plasmodia were seen.

Diagnosis. This onset is consistent with that of almost any of the acute diseases. Certain of them are, however, much more probable than the others. These are scarlet fever, tonsillitis, influenza and pneumonia.

Malaria is unlikely in November, and in Boston. It is excluded by the absence of plasmodia in the blood. The acute onset with headache suggests, to a certain extent, meningitis. The hyperesthesia is also rather suggestive. The headache and hyperesthesia are, however, equally well explained by the temperature. An onset as acute as this is

very unusual in tubercular meningitis at this age. The absence of all signs of meningeal irritation is also against meningitis in any form. The low white count practically rules out cerebrospinal meningitis. The absence of sore throat at this time, only a few hours after the onset, does not, of course, rule out scarlet fever and tonsillitis, but makes them somewhat improbable. Neither a rash nor signs in the lungs can be expected thus early. The relatively greater increase in the rate of the respiration over that of the pulse suggests pneumonia, but it is hardly marked enough to be of much importance. There is nothing about the onset and symptoms inconsistent with influenza, and the absence of physical signs is entirely consistent with this disease. The leucocyte count is of great assistance in this instance. The low count practically rules out scarlet fever, tonsillitis and pneumonia, all of which have a marked leucocytosis, and is characteristic of influenza, the only other condition to be seriously considered. The diagnosis of INFLUENZA seems, therefore, justified.

Prognosis. There is, naturally, no danger as to life. The fever will probably not last many days and she will be able to return to school in a week or ten days.

Treatment. The treatment is simple; a tablespoonful of castor oil, laxol or syrup of senna, to empty the bowels; a diet of milk, broth and simple starchy foods; an ice-cap for the headache; phenacetin and salol, $2\frac{1}{2}$ grains each, every three hours, for the headache and general discomfort.

CASE 45. Leonard O., nineteen months old, had always been well. He was in Windham, Conn., on a visit from September 27 to October 4. He was well while there but was severely bitten by mosquitoes. Although the weather was cool and he had eaten nothing unusual, he began to have loose movements of the bowels October 17. He continued to have four or five loose, greenish movements, without curds or mucus, daily. His appetite was poor, but he did not vomit. He was feverish and sick all day on the 17th, but, aside from the loose movements, had no very definite symptoms. He was fairly well on the 18th, but was worse again on the 19th. When he woke in the morning of the 21st he was cold and rather blue and his face looked pinched. Heaters were applied and brandy given, and after a few hours he became warm again. He then seemed a good deal relaxed, sweat quite freely and was depressed all day. He was seen October 22. He then appeared fairly well, but was quiet and looked run down.

Physical Examination. He was well developed and nourished, but rather flabby. Pallor was marked. He had twelve teeth. The anterior fontanelle was not quite closed. The tongue was clean and the throat normal. There was a slight rosary. The heart, lungs and abdomen were normal. The liver was palpable 3 cm., and the spleen 1 cm., below the costal border. The extremities were normal. There was no spasm or paralysis. The knee-jerks were equal and normal. There was no enlargement of the peripheral lymph nodes. The rectal temperature was normal. A movement which was seen was watery, black (presumably from bismuth) and foul, but contained no curds or mucus. The urine was pale, slightly acid in reaction, of a specific gravity of 1,012 and contained no albumin.

Diagnosis. The periodic increase in the severity of the symptoms ought at once to suggest the possibility of malaria, in spite of the persistance of the diarrhea. The peculiar condition on waking on the 21st, taken in connection with the subsequent sweating and depression, makes this diagnosis very probable. In fact, this combination is very characteristic of the malarial paroxysm in infancy, at which age the

chill is usually replaced by cyanosis and cold extremities. The sweating in this instance was, however, more pronounced than is usual. The marked pallor and the enlargement of the spleen are further corroborative evidence. A slight enlargement of the spleen, as in this instance, is, however, not very uncommon in many acute infections in infancy. The enlargement may, moreover, be a chronic one due to the same disturbance of nutrition in the past which caused the rickets, the results of which are shown in the open fontanelle, the slightly delayed dentition and the rosary. Further evidences in favor of malaria are the stay in a malarial district and the fact that he was bitten by mosquitoes. The time between the possible infection and the development of the symptoms corresponds, moreover, to the average incubation period of malaria. The diagnosis of MALARIA is, therefore, justified. This diagnosis should, however, never be made positively without an examination of the blood. The blood was examined in this instance and a single infection with the tertian organism found.

Prognosis. The prognosis is, of course, good. Malaria in infancy usually yields very promptly to treatment.

Treatment. The treatment is, of course, the administration of quinine. The same rules apply to its use in infancy as in later life. Babies will usually take the sulphate of quinine in solution by mouth without difficulty and without vomiting. If it is vomited it may be given in a suppository. It is rarely necessary to give it subcutaneously. This boy should have 2 grains of the sulphate of quinine by mouth, or $2\frac{1}{2}$ grains by rectum, in the late evening of the 22d, 24th, 26th and 28th. He ought not to have any paroxysms after the first two doses and, theoretically, should be cured by the four doses. In order to be doubly safe, however, it will be well to give him 1 grain of sulphate of quinine twice daily for two days, four times, at intervals of a week. The saccharated carbonate of iron, in doses of 3 grains, three times daily, after eating, will help the anemia. The loose movements are a symptom of the malaria and will cease with the cure of this condition.

CASE 46. Ruth A., three and one-half years old, had always been well, except for an attack of chicken-pox a year previously. She became a little feverish and began to complain of pain in the left wrist during the afternoon of March 9. Her temperature that night was 100.5° F. Nothing abnormal was detected about the arm. There was no history of any injury. The next morning the temperature was 102.5° F. and there was more pain and some tenderness, but no heat or redness, in the wrist. From this time on the temperature and the pulse-rate rose steadily and the pain became very severe. Aspirin, in fairly large doses, had had no effect on either the pain or the temperature. She had had no chills and had not vomited. She was seen in consultation late in the afternoon of March 11, forty-eight hours after the onset.

Physical Examination. She was well developed and nourished and of good color. She was actively delirious but, when roused, answered rationally. There was no rigidity or tenderness of the neck and no neck sign. The pupils were equal and reacted to light. The throat was normal, the tongue moderately coated. The heart, lungs and abdomen were normal. The liver and spleen were not palpable. The extremities were normal, except for the left arm. There was no spasm or paralysis. The knee-jerks were equal and normal. Kernig's sign was absent. The lymph nodes in the left axilla were slightly enlarged and tender; the other peripheral lymph nodes were not palpable. There was considerable deep swelling in the upper two thirds of the left forearm with moderate tenderness on pressure, more marked over the radius than over the ulna. There was no redness, but some heat. There was also a little swelling about the elbow-joint and in the lower portion of the upper arm. There was no tenderness over the elbow-joint and no evidences of effusion into the joint. Passive motions were slightly limited at the elbow, but not at the wrist. The rectal temperature was 104° F., the pulse 160.

Diagnosis. The diagnosis is not a difficult one. Scurvy can be ruled out by the age of the child, the acuteness of the onset, the high temperature and the localization of the process

in one extremity. Rheumatism is unusual at this age and, as a rule, its symptoms are mild. If they are severe, they are located in the joints, not in or about the shafts of the bones, and several joints are involved at once. Inflammation of the superficial tissues can be ruled out by the absence of redness and the deepness of the swelling. The trouble must, therefore, be located in or about the shafts of the bones, that is, it is an osteomyelitis or a periosteitis. It is unimportant for practical purposes whether it is a periosteitis, an osteomyelitis or both, for in any case an immediate operation is necessary. The swelling shows that there is certainly a PERIOSTEITIS. In all probability there is an OSTEOMYELITIS also, although the absence of extreme localized tenderness is somewhat against it.

Prognosis. The prognosis is very grave. The chances are much against recovery even with an immediate operation.

Treatment. The treatment is immediate operation.

CASE 47. John D. was the second child. The first child was born dead at eight months. There had been no other pregnancies. His mother had had no symptoms of syphilis; his father was not seen.

He was born at full term after a normal labor and was normal at birth. Dryness of the palms and soles and cracking of the lips was noticed when he was two weeks old. A week later he began to have trouble in breathing through his nose and kept his mouth open. The trouble in breathing steadily increased, and when he was four and a half weeks old he began to have great difficulty in nursing. He did not vomit. The movements from the bowels were normal. He had had no fever. He was seen in consultation when five weeks old.

Physical Examination. He was small but well-nourished. There was slight cyanosis of the lips and extremities. The anterior fontanelle was 3 cm. in diameter and slightly depressed. The posterior fontanelle was not quite closed. The pupils were equal and reacted to light. There was no strabismus. There was a slight purulent discharge from the left eye. He lay with his head held back. The neck was, however, freely moveable. His mouth was open and no air entered through the nose. His breathing was irregular, difficult and rapid. There was a slight purulent discharge from one nostril. The nasal mucous membrane was much swollen, but no membrane was visible. A probe could be passed through both nostrils, but with considerable difficulty; its passage caused bleeding. Examination with forceps by a nose and throat specialist showed no adenoid growth. There was nothing abnormal in the pharynx or in the region of the tongue. The lips were cracked. There was retraction of the epigastrium with inspiration. The heart and lungs were normal, except that at times no respiratory sound could be heard. The cry was strong and of normal character, when he had breath enough to cry. The abdomen was negative. There was no enlargement of the liver or spleen. The genitals were normal. There were no mucous patches about the anus. The extremities were normal except for redness, thickening and scaling of the palms and soles. There was no spasm or paralysis of the face or of the extremities. The knee-jerks

were equal and normal. Kernig's sign was absent. There was a fine desquamation over the whole body, but no eruption or scars of any old eruption. The rectal temperature was 104° F.; the pulse 160, but fairly strong. The baby seemed a good deal exhausted.

Diagnosis. The purulent discharge from the eye is an incidental and unimportant complication. The retraction of the epigastrium with inspiration shows that there is an obstruction to the entrance of air somewhere in the respiratory tract, but gives no hint as to the location of the obstruction. The cyanosis has the same significance. The clear, strong cry rules out any obstruction in the larynx. The high temperature and rapid respiration suggest some pathological condition in the lungs. The character of the respiration and the absence of physical signs in the lungs rule this out, however, and the temperature can be explained equally well by toxic absorption from the nose and exhaustion. The negative examination of the throat rules out obstruction from adenoids, retropharyngeal abscess or malformation. The obstruction to the entrance of air must, therefore, be located in the nose. The reason that the baby is so much troubled by this obstruction is that he has not yet learned to breathe through his mouth, and that it prevents him from getting sufficient nourishment. It is the nasal obstruction which is causing the serious symptoms in this instance, and it is this condition which must be relieved in order to save the baby's life. The retraction of the head is not a sign of meningitis, but merely the result of the baby's effort to get more air by straightening the upper air passages.

The possible causes of the nasal obstruction in this instance are simple rhinitis, diphtheritic rhinitis and syphilitic rhinitis. Any one of them, even the simple rhinitis, can, at this age, cause symptoms as serious as those present in this instance. Both simple and diphtheritic rhinitis usually have more discharge than there is in this instance, and the discharge in nasal diphtheria is usually thin and irritating. The absence of visible membrane does not rule out nasal diphtheria, because it is often absent or out of sight in this disease. While, however, there is nothing about the symptoms or local con-

ditions to exclude simple or diphtheritic rhinitis, there is much in the history and physical examination which points toward syphilitic rhinitis. The previous stillbirth, the appearance of dryness of the palms and soles and cracking of the lips at two weeks and of nasal obstruction at three weeks, and the redness, thickening and scaling of the palms and soles, while individually not of much importance, together make the diagnosis of SYPHILITIC RHINITIS practically certain. The good health of the mother does not, of course, count in any way against the diagnosis of syphilis, because syphilis is often transmitted from father to child, although the mother shows no signs of the disease.

Prognosis. The prognosis is very grave, because the cause of the obstruction, the syphilis, cannot be removed at once and it is doubtful whether the nasal obstruction can be relieved by local treatment for so long a time as will be required to get the syphilis under control. A point in his favor is that he is nursed.

Treatment. The specific treatment of the syphilis must, of course, be begun at once. The local treatment of the nasal obstruction is, however, of more immediate importance and, next to this, the administration of food. A 1-5,000 solution of adrenalin chloride is more likely to relieve the nasal obstruction than anything else. This is best applied by dropping it into the nose with a medicine dropper while the baby is lying on its back, so that it can run downward over the nasal mucosa. Five drops in each nostril every hour should be sufficient. If it is not effective in this strength, it is hardly worth while to try stronger solutions. If it does not give relief, a 0.5% solution of cocaine may be tried. This must be used cautiously, as babies are very easily poisoned by cocaine. If these measures are unsuccessful, pieces of rubber tube (a catheter is suitable), as large as can be passed into the nose and long enough to reach the pharynx, may be inserted into both nostrils.

If the nasal obstruction is relieved by these procedures the baby will probably be able to take the breast. If he is not, the milk must be withdrawn with a breast pump or squeezed out by hand and given to him with a dropper or a Breck

feeder, or through a stomach-tube passed through the mouth. He ought to get at least sixteen ounces in the twenty-four hours; twenty ounces if possible.

A piece of mercury ointment, half the strength of the officinal unguentum hydrargyrum, the size of a large pea, should be rubbed in daily, the location of the application varying from day to day. This should be continued, with occasional short interruptions, for a year. It must be remembered in this connection that the earliest symptom of mercurial poisoning in infancy is diarrhea, not salivation. It should then be used, as a matter of precaution, one month in every three for three or four years and, even if there are no symptoms, again for a couple of years at the time of the second dentition, and at puberty.

SECTION V.

DISEASES OF THE NOSE, THROAT, EARS AND LARYNX.

CASE 48. Virginia G., seven months old, had always had a rather feeble digestion, but had recently been doing very well on a wet nurse. She had had a "cold in the head" about six weeks before. Soon after recovery from this cold, which lasted about a week, she began to have paroxysms of cough at night and during her naps. The cough disturbed her sleep considerably, but not enough to affect her general condition. She did not cough much when awake, had no nasal discharge or fever, did not snore at night or keep her mouth open, and nursed well.

Physical Examination. She was small but fairly nourished and of fair color. The anterior fontanelle was 3 cm. in diameter and level. There was no snuffles and she kept her mouth shut. There were no teeth and the gums were not inflamed. The fauces were normal. The membranæ tympanorum were normal. There was a slight rosary. The heart, lungs and abdomen were normal. The liver was palpable 2 cm. below the costal border in the nipple line. The spleen was not palpable. The extremities were normal. There was no spasm or paralysis; the knee-jerks were equal and normal. The cervical lymph nodes were slightly enlarged.

Diagnosis. The physical examination shows nothing in the nose, fauces or chest to account for the cough. There are no evidences of otitis media, difficult dentition or disturbance of digestion, all of which are sometimes said to be causes of reflex cough. A "nervous" cough probably does not occur at this age. Nevertheless, she coughs, and there must be some cause for it. This cause will probably be found in the nasopharynx, the only region not investigated in the physical examination, in spite of the absence of all of the symptoms of adenoids common in older children. An examination of the

nasopharynx then showed a small amount of soft ADENOIDS, not sufficient to interfere in any way with respiration. Adenoids of this sort, however, if inflamed, will often secrete just enough fluid to keep up a constant tickling of the throat and cough when the baby is asleep. They are one of the most common causes of persistent cough in infancy.

Prognosis. Removal of the adenoids will stop the cough at once.

Treatment. It is hardly worth while to waste time on palliative measures, such as applications to the nasopharynx through the nose or mouth, when operation will remove the cause at once and hence cure the cough. The operation is a simple one and not at all dangerous. There is, moreover, a certain amount of risk in leaving the adenoids *in situ*, because they are often the starting point of attacks of rhinitis and otitis media and, if they increase in size, will cause obstruction to nasal respiration. It is true that they may grow again but, if they do, they can be removed again. In the meantime, the baby is relieved of its symptoms and freed from the dangers to which adenoids expose it.

CASE 49. John W., twenty-five months old, had always had a rather feeble digestion and been backward in development. He had taken less and less solid food during the last three months, and for the last month had refused everything but liquids. Swallowing seemed to trouble him. He did not vomit, had no flatulence or hiccough, and had one small, normal movement daily. He had lost considerable weight, strength and color during the past month. He had no cough or nasal discharge, kept his mouth shut and did not snore at night. There had been no fever.

Physical Examination. He was fair-sized, but flabby and pale. The anterior fontanelle was not quite closed. There was no nasal discharge. The membranæ tympanorum were normal. He kept his mouth shut. He had twenty teeth. His tongue was clean. The tonsils were somewhat enlarged, but not inflamed. There was a slight rosary. The heart and lungs were normal. The liver was palpable 2 cm. below the costal border in the nipple line. The spleen was not palpable. The abdomen was rather large and lax, but otherwise normal. The extremities were normal. There was no spasm or paralysis; the knee-jerks were equal, but rather feeble; there was no Kernig's sign. There was no enlargement of the peripheral lymph nodes.

Diagnosis. The rosary shows that he has, or has had, a certain amount of rickets. The open fontanelle and large abdomen are probably also manifestations of the same disease. The flabbiness and pallor are presumably due to an insufficient supply of food. The unwillingness to eat can hardly be due to loss of appetite from indigestion because there are no other symptoms of indigestion. The enlargement of the tonsils seems hardly great enough to interfere mechanically with the swallowing of solid food. There must be, therefore, some other cause. This will probably be found in the nasopharynx, as ADENOIDS in some way often make swallowing difficult. Examination of the nasopharynx with the finger showed a large mass of firm adenoids situated posteriorly, so that they did not interfere with respiration. In the absence of any other explanation it is almost certain that the adenoids, or the adenoids and the enlarged tonsils

together, make the swallowing of solid food so uncomfortable that he is unwilling to take it. In consequence, he is taking an insufficient amount of nourishment and this, in turn, is the cause of the progressive failure.

Prognosis. The removal of the tonsils and adenoids will soon be followed by willingness to take solid food. When he begins to take a proper amount of nourishment he will soon regain his weight, strength and color.

Treatment. The treatment is the immediate removal of the tonsils and adenoids.

CASE 50. George T., thirteen months old, began to refuse his food February 24. He was feverish and lost weight rapidly. He took his food very poorly, but did not vomit and his dejections were normal. He had a frequent, painful cough. There was no nasal discharge. He was sent to the Infants' Hospital February 28 with the diagnosis of bronchitis.

Physical Examination. He was fairly developed and nourished. He was pale, but not cyanotic. The general appearance was that of sepsis. The anterior fontanelle was 3 cm. in diameter and level. There was slight puffiness about the eyes. There was a considerable general, soft, non-fluctuant swelling in the right neck, extending forward from about the angle of the jaw to just beyond the median line and downward over the clavicle. The alæ nasi moved with respiration. There was no nasal discharge. He held his head slightly extended and kept his mouth open. His throat was full of thick mucopurulent material which rendered inspection difficult. The right tonsil was moderately enlarged and somewhat reddened. The respiration was somewhat difficult, but not noisy. His cry was clear. There was no retraction of the suprasternal, supraclavicular or intercostal spaces. Percussion of the lungs showed nothing abnormal. Respiration was normal in character but diminished in intensity. Numerous medium and coarse moist râles were heard throughout both chests, both back and front. They were exactly alike on both sides. The same sounds were heard under the upper part of the sternum and in the middle of the back. The abdomen showed nothing abnormal. The liver was just palpable in the nipple line. The spleen was not palpable. The extremities showed nothing abnormal. There was no spasm or paralysis. The knee-jerks were equal and normal. There was no Kernig's sign. The rectal temperature was 104.5° F., the pulse 150, the respiration 35.

The urine was high in color, acid in reaction, of a specific gravity of 1,020, and contained no albumin or sugar.

The leucocyte count was 30,000.

Diagnosis. The quiet respiration and the clear cry show that there is no trouble in the larynx. The facts that the râles are alike on both sides, both back and front, and that

the same sounds are heard under the manubrium and in the middle of the back show that they are made high up and transmitted downward through the bronchi, and not made in the chest. This, of course, rules out bronchitis. The high temperature, the marked leucocytosis and the general appearance of sepsis point very strongly to a focus of pus somewhere. The soft, non-fluctuant character of the swelling in the neck is not consistent with an external abscess. The swelling of the tonsils is not as much as would be expected if there was a peritonsillar abscess. The unwillingness to take food, the puffiness of the eyes, the swelling of the neck, the position of the head and the prominence of the tonsil all suggest an inflammatory process in the nasopharynx. The collection of pus is, therefore, probably in the nasopharynx; that is, there is almost certainly a RETROPHARYNGEAL ABSCESS. It is noted in the physical examination that, on account of the large amount of mucopurulent material in the throat, inspection was difficult, and, therefore, presumably unsatisfactory. In such cases inspection alone is not sufficient and will often fail to reveal serious conditions. The throat should always be palpated when inspection is not perfectly satisfactory. Palpation, in this instance, showed that the right side of the pharynx was filled by a tense, elastic swelling which extended downward to the level of the larynx and pushed the tonsil forward, thus confirming the diagnosis of retropharyngeal abscess.

Prognosis. The prognosis is grave even if the abscess is opened at once, as it should be, because the baby is in poor condition and generally septic and may not be able to rally even when the source of infection is removed.

Treatment. The treatment is to open the abscess at once. It is not safe to leave it alone, because if it does not rupture of itself it interferes with deglutition and respiration and there is constant absorption from the abscess, and if it does open itself there is danger of suffocation from the sudden discharge of pus or of a secondary inhalation bronchopneumonia. It is far better to open it through the mouth than from the outside. The best way to open it is with a knife, guarded except at the point, passed along the finger as a

guide. A gag must not be used, because, if the mouth is opened too widely, sudden death may result from the pressure of the abscess on the pneumogastric nerve. The mouth can be held sufficiently wide open with the finger or a tongue depressor. The incision is best performed with the patient in the upright position. If he is tipped forward the instant the incision is made, there is no danger of pus entering the air passages. The incision must be opened up widely with the finger in order to insure the thorough emptying of the abscess cavity. The abscess should be squeezed once or twice daily with the finger to keep up the drainage and to prevent the opening from closing. It will be well to wash out the mouth several times daily with some mild alkaline solution.

If he does not take his food well he must be fed with a tube, introduced through the mouth. No stimulation is necessary at present.

CASE 51. John R., six months old, began to have a slight "cold in the head" February 15, but had no other symptoms. Three days later he was taken suddenly sick with fever, cough and difficulty in breathing. He lost his appetite, but showed no other symptoms of gastro-enteric disturbance. Swallowing seemed to cause discomfort. He apparently had no pain and did not put his hand to his ear. He was taken to a physician, February 21, who found the rectal temperature 104.2° F., the pulse 160 and the respiration 52. He sent the baby to the Infants' Hospital with the diagnosis of pneumonia. He was not seen and examined until the next day.

Physical Examination. He was a large, fat baby. His color was good. He took considerable interest in his surroundings. The alæ nasi did not move and the respiration was not grunting or painful, even when he cried. The anterior fontanelle was 3 cm. in diameter and level. There was no tenderness on pressure over the mastoids. There was no rigidity of the neck. The pupils were equal and reacted to light. There was a slight nasal discharge. The tongue was moderately coated. The throat was slightly reddened, but otherwise normal. The heart and lungs were normal. The liver was palpable 2 cm. below the costal border in the nipple line. The spleen was not palpable. The extremities were normal. There was no spasm or paralysis. The knee-jerks were equal and lively. There was no Kernig's sign. There was no enlargement of the peripheral lymph nodes. The rectal temperature was 100° F., the pulse 115, the respiration 38.

The urine was pale, clear, acid in reaction, of a specific gravity of 1,012 and contained no albumin.

Diagnosis. The acute onset with fever, cough and difficulty in breathing and the relatively greater increase in the rate of the respiration over that of the pulse point strongly to pneumonia. His general appearance, the absence of motion of the alæ nasi and of grunting and painful respiration, the drop in the temperature and the normal condition of the lungs, while they do not exclude pneumonia, make it very improbable. Some other cause for the symptoms must be sought. The only place which has not been investigated is

the ear. The absence of pain, putting the hand to the ear and tenderness on pressure over the mastoids, does not count at all against otitis media. Pain is often absent in this disease. Babies seldom put their hands to their ears when they have otitis media and often do under other conditions. Tenderness over the mastoids is extremely rare in middle-ear disease at this age. Examination of the ears showed marked redness and some bulging of the right, and slight reddening of the left membrana tympani, showing that the trouble was OTITIS MEDIA.

Prognosis. The prognosis is good both as to life and the maintenance of normal hearing if the proper treatment is carried out. If the ear is opened early and proper drainage secured, extension to the mastoid, sinuses or meninges very seldom occurs at this age. If the drum is opened before it ruptures, it usually heals without a scar and leaves the hearing unimpaired.

Treatment. The right drum should be opened at once. The left should not be touched at present. Both ears should be syringed three or four times daily with warm water.

CASE 52. Joseph B., twenty-two months old, was seen in consultation July 22. He lived in a malarial district. He had always been delicate and pale. He had had a cough and a slightly elevated temperature since an attack of bronchitis in the early spring. He had seemed worse and the temperature had been higher and more irregular during the last two weeks. He had had a chill the night before, which was followed by a temperature of 105° F. and sweating. His appetite had been poor, but there had been no symptoms of indigestion, and the movements had been normal. Nothing abnormal had been found on physical examination except pallor and a slight enlargement of the spleen. The urine had shown nothing abnormal. An almost positive diagnosis of malaria had been made on the basis of the chill, fever and sweating, the enlargement of the spleen, the pallor and the apparent absence of any other cause for the symptoms.

Physical Examination. He was small and only fairly nourished. Pallor was marked. The anterior fontanelle was closed. He had twelve teeth. There was a slight nasal discharge and there was a little mucopurulent secretion in the nasopharynx. His tongue was moderately coated. There was a slight rosary. The heart and lungs were normal. The abdomen was rather large but lax. The liver was palpable 2 cm. below the costal border in the nipple line. The spleen was palpable 3 cm. below the costal border. The extremities showed nothing abnormal. There was no spasm or paralysis. The knee-jerks were equal and normal. Kernig's sign was absent. There was a slight general enlargement of the peripheral lymph nodes.

The urine was pale, clear, slightly acid in reaction, of a specific gravity of 1,015 and contained no albumin or sugar. The sediment showed no formed elements.

BLOOD.

Hemoglobin,	42%
Red corpuscles,	4,560,000
White corpuscles,	30,000
Small mononuclears,	45.5%
Large mononuclears,	6.0%
Polynuclear neutrophiles,	47.5%
Eosinophiles,	1.0%

There was much variation in the size and shape of the red corpuscles, but no nucleated forms were seen. No plasmodia malariæ were seen.

Diagnosis. The leucocytosis and the absence of plasmodia at once exclude malaria. The rosary means a slight but unimportant amount of rickets. The blood has the characteristics of secondary anemia in infancy. The enlargement of the spleen is probably due to the same cause as the anemia. The continued irregular temperature and the chill suggest tuberculosis or confined pus. Tuberculosis at this age is rarely accompanied by chills, and it is unusual to have a high, irregular temperature without some physical signs of tuberculosis. Tuberculosis is, however, the most probable diagnosis unless some other cause for the symptoms can be found. The most common locality for confined pus in infancy, when it is not discovered on a routine examination, and when the urine is normal, is the middle ear. The nasal discharge and the mucopurulent secretion in the nasopharynx suggest, in this instance, the possibility of an infection of the middle ear. An examination of the ears showed bulging and reddening of both membranæ tympanorum. Paracentesis showed pus in both middle ears. The diagnosis is, therefore, Otitis Media.

Prognosis. The prognosis is good. The temperature will gradually work down to normal and the general condition improve. There is but little chance of extension to the mastoid cells or to the sinuses. Hearing will probably not be impaired.

Treatment. Now that the ears have been opened, the treatment is syringing with warm water, three or four times daily, until the discharge has ceased and the incisions have healed.

CASE 53. Jennie C. was the first child of healthy parents. She was born after a normal labor, was nursed for six months and did well. When six months old she was said to have had pneumonia and some brain trouble with it; at any rate, she had convulsions. During and since this illness she had been fed on Horlick's Malted Milk, prepared with water. She had lost weight, had vomited occasionally and had had a dozen or more small, green, watery movements daily. Her nose was always stopped up. She kept her mouth open and had considerable cough. For two weeks she had had many attacks daily in which she made a crowing sound, held her breath and got black in the face. During the last week several of these attacks had terminated in convulsions. She was seen when seven months old.

Physical Examination. She was fairly developed and nourished. The anterior fontanelle was 5 cm. in diameter, but level. There was no craniotabes. The head was of good shape. The eyes were rather prominent. She was bright and intelligent. The pupils were equal and reacted to light. The nares were partially occluded and the mouth was kept open. The throat showed nothing abnormal on either inspection or palpation. An attempt to introduce the finger into the nasopharynx was unsuccessful. The tongue was dry and considerably coated. There were no teeth. There was a marked rosary. She held up her head, but was unable to sit alone. The heart and lungs were normal. The abdomen was rather large and lax. The lower border of the liver was palpable 3 cm. below the costal border in the nipple line. The spleen was not palpable. There was slight enlargement of the epiphyses at the wrists. There was no spasm or paralysis of the extremities. The knee-jerks were equal and lively. There was no Kernig's sign. During the examination she started to cry, then drew in her breath with a crowing noise, stopped breathing and became moderately cyanosed. After perhaps a minute she began to breathe again and her color quickly became good. The mother said that this attack was a very mild one and not nearly as severe as many.

Diagnosis. The condition here is a complicated one. She undoubtedly has a chronic intestinal indigestion as the result

of improper feeding. She also has a moderate amount of rickets. This is proved by the marked rosary and the enlargement of the epiphyses at the wrists. Other abnormalities which are presumably signs of rickets are the large fontanelle, the delayed dentition and the lax abdomen. She has, in addition, a chronic rhinitis and presumably adenoids, although this is not proven, since the attempt to examine the nasopharynx was unsuccessful.

The most important conditions, however, at any rate in the opinion of the parents, are the attacks of asphyxia and the convulsions. These attacks are so characteristic of the condition known as LARYNGISMUS STRIDULUS that a differential diagnosis is hardly necessary. The diseases which might possibly be confused with it are congenital laryngeal stridor, catarrhal laryngitis and laryngeal diphtheria. Congenital stridor is present at birth, or develops soon after, is constant instead of being paroxysmal and is not accompanied by cyanosis. The attacks of difficult respiration in catarrhal laryngitis occur less frequently and usually only at night, are of longer duration and the breath is never held in them. The difficulty with respiration in laryngeal diphtheria is constant and progressive and the breath is not held.

Laryngismus stridulus is not properly a disease, but merely a manifestation of the spasmophilic diathesis. In this disease there is a marked increase in the nervous excitability, which shows itself in various ways, the most characteristic manifestations being laryngismus stridulus, tetany and convulsions. The convulsions in this instance are undoubtedly merely another manifestation of this diathesis. It is almost certainly due to some disturbance in the metabolism of calcium. It is uncertain whether this disturbance is or is not due to parathyroid insufficiency. There is in all probability a deficiency of calcium salts in the blood in the spasmophilic diathesis. It is very possible that her food during the past month contained an insufficient amount of calcium, or contained it in a form not easily utilized. The rickets is to be regarded, therefore, merely as another manifestation of the disturbance of nutrition from the unsuitable food and not as the cause of the paroxysmal attacks. The rhinitis and

adenoids can have no direct etiological connection with the attacks, but may possibly act as exciting causes through reflex irritation.

Prognosis. The immediate prognosis of the attacks is, on the whole, good, but must be guarded, because babies do sometimes die in these attacks. The prognosis in general depends very largely on whether or not she can get the best treatment. If she can, recovery will be rapid; if she cannot, the chances are rather against her.

Treatment. The immediate treatment of an attack is to slap her on the back or to dash cold water on her face or chest. Artificial respiration is sometimes necessary. Most attacks will, however, cease quickly if nothing is done. Bromide of soda, in doses of from three to five grains, in an aqueous solution, three or four times daily, will tend to diminish the frequency of the paroxysms.

The treatment of the spasmophilic diathesis, and at the same time of the intestinal indigestion and rickets, consists in regulation of the diet. Human milk always quickly relieves this condition. A purely carbohydrate diet relieves it, but much less promptly and is, moreover, not suitable for a baby of this age. A return to cow's milk in any form, at any rate until a considerable time has elapsed, almost invariably causes a return of the symptoms. The only rational food for this baby is, therefore, human milk. If she cannot get it she must be given a starch and sugar solution for as long a time as is possible, due regard being paid to her general condition, and then quickly worked on to some modification of cow's milk.

It is possible that the administration of some of the calcium salts, like the lactate, may do good. The indications are so doubtful and the results to be expected so slight compared with those obtained from human milk that they are, however, hardly worthy of consideration. Parathyroid extract, in doses of one twentieth of a grain, three times daily, would seem a more rational treatment, but has not as yet been used enough to prove whether or not it is of benefit.

CASE 54. Mary S., four years old, had had a slight nasal discharge and seemed a little feverish all day. She went to bed feeling fairly well, however, after eating her usual supper. Soon after going to sleep she began to cough from time to time, the cough being dry, hard and metallic. About nine o'clock her parents heard her breathing noisily and apparently struggling in her sleep. When they got to her they found her sitting up in bed moderately cyanosed and breathing with much difficulty. Inspiration was noisy and difficult, expiration quiet. She occasionally gave a short, dry, metallic cough. She tried to cry out, but could not raise her voice above a whisper. At times she clutched at her throat. She was seen at 9.30 P.M.

Physical Examination. She was then breathing quietly and her color was good. Her voice was hoarse and her cough metallic. There was a slight nasal discharge and the throat was a little reddened. The heart, lungs and abdomen were normal. The liver and spleen were not palpable. The extremities showed nothing abnormal. There was no spasm or paralysis. The knee-jerks were equal and lively. Kernig's sign was absent. There was no enlargement of the peripheral lymph nodes. The rectal temperature was 101° F.

Diagnosis. The only diseases to be considered are laryngeal diphtheria and catarrhal laryngitis with "spasmodic croup." The sudden onset and the short duration of the difficulty in respiration positively rule out laryngeal diphtheria, in which the onset is slow and the difficulty in respiration steadily increases without intermissions. The history of the nasal discharge during the day and the occurrence of the attack in the early evening are also very characteristic of "spasmodic croup." The diagnosis is, therefore, CATARRHAL LARYNGITIS with "spasmodic croup."

Prognosis. There is, of course, no danger as to life. She may or may not have another attack during the night. She is likely to have paroxysms the next two or three nights unless they are prevented by treatment. Having had "spasmodic croup" once, she is likely to have it for the next few years whenever she "catches cold."

Treatment. This attack is a mild one and does not require

very active treatment. She should have twenty drops of the wine of ipecac and ten drops of paregoric at once, and ten drops of the wine of ipecac and five drops of paregoric every hour for two or three doses, the object being to relax, but not to nauseate her. A " croup kettle " or a dish of boiling water in the room will moisten the air and will aid in preventing the recurrence of the paroxysms. The temperature of the room should be kept at about 64° F. She should be kept in the house or, if feverish, in bed for the next three or four days, and should be given ten drops of the wine of ipecac every hour, beginning at 3 P.M., until bedtime, each afternoon. If the paroxysms recur, the treatment recommended for to-night should be repeated.

SECTION VI.

DISEASES OF THE BRONCHI, LUNGS AND PLEURÆ.

CASE 55. John J., three years old, started in with a "cold in his head" and cough, January 10. The nasal discharge diminished and the cough became drier on the 12th. He did not seem at all sick until the 13th. The cough was then much more severe and apparently painful. His appetite was poor and he appeared feverish.

Physical Examination. He was well developed and nourished. His cheeks were flushed. There was a slight nasal discharge. The ear drums were normal. The whole throat was moderately reddened, but there was no enlargement of the tonsils and no exudation. His tongue was slightly coated. The lungs showed nothing abnormal except a few sibilant and sonorous râles scattered throughout both chests, both back and front. The heart was normal. The abdomen was normal. The liver and spleen were not palpable. The extremities were normal. There was no spasm or paralysis. The knee-jerks were equal and normal. There was no enlargement of the peripheral lymph nodes. The rectal temperature was 100.8° F., the pulse 132, the respiration 34.

Diagnosis. The diagnosis is, of course, BRONCHITIS.

Prognosis. The prognosis at present is perfectly good. The only danger is of a consecutive bronchopneumonia. This ought not to develop if he has proper care and treatment.

Treatment. The treatment of bronchitis depends on the stage of the bronchitis and the condition of the bronchial mucous membrane. The bronchitis in this instance is in the early stage. The bronchial mucous membrane is congested, dry, swollen and reddened, and consequently there is but little secretion. The object of the treatment at this stage is to relax the mucous membrane and in this way increase the secretion. The drugs which will do this are the so-called

" sedative " expectorants. These are tartar emetic, apomorphin and ipecac. The only one of these which is safe to give to children is ipecac. This may be given as the wine or syrup. It should be given in water, not mixed with syrups, which are inert and disturb the digestion. The object of the ipecac is to cause relaxation of the mucous membrane, not nausea or vomiting. From five to ten drops every two hours is about the right dose for this boy. The alkalies have somewhat the same action and may be used instead of ipecac. A moist atmosphere also tends to moisten and relax the bronchial mucous membrane. It will be well, therefore, to have a vessel of boiling water or a " croup-kettle " near him.

The object of the sedative expectorants is to relax the bronchial mucous membrane and in this way to hasten the cure of the disease. Their dosage and the length of time that they are given must be regulated by the condition in the bronchi, as revealed by physical examination. They are not given for the symptom, cough, and in using them, therefore, the amount of coughing must not be considered. The symptom, cough, is best controlled by some preparation of opium. The safest form of opium for a child is paregoric. This boy may have from five to fifteen drops every two or three hours for the cough if it is troublesome. This also should be given in water, not in syrup. The ipecac and paregoric must not be combined in the same prescription, because they are given for entirely different purposes, and it is necessary to be able to give either one without giving the other. He needs the ipecac constantly; he may need the paregoric only occasionally.

It will be well to give him a tablespoonful of castor oil, or one or two teaspoonfuls of syrup of senna at once. The diet should be liquids and soft solids. It will be much wiser for him to stay in bed. He should have plenty of fresh air, but will probably be more comfortable if the temperature does not go below 60° F.

CASE 56. Mary J., nine months old, had always been a well, strong baby. She began to have a little running from the nose March 1. March 3 she began to cough a good deal and to have a little fever. March 4 she had more fever, coughed a great deal and had considerable rattling in the chest. She took but little food, but digested that little well. She grew rapidly worse and was seen in consultation the night of March 5.

Physical Examination. She was well developed and nourished, but markedly cyanotic. The alæ nasi moved with respiration. She was unable to lie down and was very restless. The examination was superficial because of her critical condition. The throat showed nothing abnormal. The cardiac area was not determined; the action was regular, the sounds feeble. There was sinking in of the supraclavicular and lower intercostal spaces, as well as of the epigastrium, with each inspiration. There was vesicular resonance all over the lungs. The respiratory sound was feeble, but normal in character. The vocal resonance was not determined. Both chests were full of fine and medium moist râles, the fine predominating. The râles were easily palpable. The extremities were cold and the whole body covered with perspiration. The temperature was not taken. The pulse was faster than could be counted. The respiration was 80.

Diagnosis. The diagnosis is, without question, BRONCHITIS. The finer and medium-sized tubes are involved to a much greater degree than the larger.

Prognosis. The condition is a very critical one and, while not hopeless, the chances are very much against recovery. She will probably not live twenty-four hours. If she does, her chances are somewhat better.

Treatment. Her condition is critical and the treatment must be immediate and energetic. The first indication is to clear out the bronchial tubes. Alternate dippings in water from 105° F. to 110° F. and from 65° F. to 75° F., as is done in resuscitating new-born infants, will probably make her cry, breathe deeply and cough, and in this way get rid of the excessive secretion. If this method is not successful, the wine or syrup of ipecac, in teaspoonful doses, will make her vomit

and in this way clear out the bronchial tubes. She must then be given plenty of fresh air and, if necessary, oxygen. The oxygen is given for the symptom, cyanosis, and must be given continuously as long as the cyanosis lasts, not intermittently as it usually is. The dippings and ipecac may be repeated as necessary. It must not be forgotten, however, that ipecac used in this way is depressing and, consequently, a dangerous remedy. If the dippings and ipecac do not relieve her, atropin, in doses of 1-500 grain, may be given subcutaneously with the object of diminishing the secretion.

She also needs immediate stimulation. Strychnia is a respiratory as well as a cardiac stimulant and is, therefore, doubly indicated. It should be given subcutaneously, in doses of 1-300 grain, every two or three hours, as necessary. Caffeine-sodium benzoate, or salicylate, in doses of from one eighth to one fourth of a grain, given subcutaneously, will also aid in keeping up the heart.

She should be fed every two hours, and will probably not take more than an ounce at a time, if she does that. She will probably not be able to take the bottle. The best way to give the food is with a Breck feeder. If she will not take it in this way, a dropper or spoon may be tried. Human milk is the best food for her; next to this, a weak modified milk, for example, one containing 2% of fat, 6% of sugar, 0.75% of whey proteids and 0.25% of casein.

CASE 57. Lizzie O., four years old, began to cough early in April. She began to whoop in about a week. She was but little depressed by the whooping-cough and got on very well until about the first of May. The cough then became worse, she lost her appetite and failed in flesh and strength. She began to be feverish and on May 6 went to bed. From that time she grew rapidly worse. She had frequent paroxysms of whooping and much cough without whooping. She raised a good deal of mucopurulent sputum. She was unable to lie down with comfort the night of May 8 and was more or less blue. She took almost no nourishment and was very restless. She was seen in consultation May 9.

Physical Examination. She was fairly developed and nourished but had evidently lost considerable weight. She was bolstered up by pillows in a reclining position as she was unable to lie flat. There was marked cyanosis of the face and extremities. The alæ nasi moved with respiration. She appeared very sick. Examination of the throat showed nothing abnormal. There was no retraction of the supraclavicular or intercostal spaces, but a little of the epigastrium. The cardiac impulse was diffuse; the apex in the fifth space just outside the nipple line. The upper border of relative dullness was at the lower border of the second rib; the right border nearly at the right parasternal line. The first sound was short and rather feeble, and at the mitral area was followed by a soft blowing murmur. The second pulmonic sound was no louder than the second aortic. There was dullness on percussion in the lower left back below the angle of the scapula, and extending outward from the spinous processes to the scapular line. In this area the respiration was bronchial in character, but diminished in intensity. The vocal resonance and fremitus were increased. There were numerous high-pitched, fine and medium moist râles. In the right axilla, at about the level of the sixth rib, there was an area of dullness about the size of a silver dollar. Respiration was here broncho-vesicular and accompanied by many fine, moist, high-pitched râles. Elsewhere respiration was normal in character, but diminished in quantity. There were many medium and coarse moist râles throughout both chests. The abdomen

showed nothing abnormal. The liver and spleen were not palpable. The extremities were normal. The knee-jerks were equal and normal. There was no edema and no enlargement of the peripheral lymph nodes. The rectal temperature was 104° F., the pulse 200, and the respiration 88.

Diagnosis. The signs of bronchitis and the presence of two separate areas of solidification in the lungs prove that she has a BRONCHOPNEUMONIA. There is nothing about the physical signs to show whether this is or is not tubercular. While it is true that whooping cough, more than any other disease except measles, predisposes to the development of tuberculosis, the infection far more often takes the form of a bronchial adenitis than of a bronchopneumonia. Non-tubercular bronchopneumonia is very common in whooping cough; tubercular, very rare. The chances are, therefore, very much in favor of its being non-tubercular. The finding of tubercle bacilli in the sputum would, of course, prove it to be tubercular; their absence would not exclude tuberculosis. The process is so acute that the skin tuberculin test would probably be negative even if it is tubercular. The white blood count would not help because, even if the bronchopneumonia is primarily tubercular, there is almost certainly a secondary infection which will cause a leucocytosis. It is of no importance anyway, in her present condition, to make a diagnosis between the two forms, because it will make no difference in the treatment.

The diffuse cardiac impulse, the enlargement of the heart upward and to the right, the short, feeble first sound, and the diminution of the second pulmonic sound (the second pulmonic sound is normally louder than the second aortic at this age) show marked weakness and dilatation. The systolic murmur at the apex is almost certainly due to a relative insufficiency of the mitral valve, as there is no reason to suspect an endocarditis, and the dilatation of the heart is amply sufficient to account for an insufficiency. It is impossible to determine whether the dilatation of the heart is due to the strain of coughing, to a myocarditis in connection with the bronchopneumonia, or to both. The chances are that it is largely due to the strain of coughing, which falls on the right side of

the heart, since only the right side of the heart is enlarged, while the enlargement is usually more uniform in myocarditis. It is very probable, however, that there may be a small myocarditic element.

Prognosis. She is in a very serious condition. She has hardly reached the height of her whooping-cough, she has bronchopneumonia and her heart is dilated. She has a chance of recovery, but only a small one.

Treatment. The first thing to do is to favor oxygenation of the blood by giving her a liberal supply of fresh air. At this time of year she may be put out of doors or by the open window. If fresh air does not relieve the cyanosis, she must be given oxygen. The indication for oxygen is cyanosis. She should, therefore, be given oxygen continuously as long as she is cyanotic, not intermittently, as is usually done.

The next indication is to stimulate the heart. Her condition demands a quick stimulant at once. Sulphate of strychnia in doses of 1-120 grain, or caffeine-sodium benzoate or salicylate, in doses of one half a grain, repeated every two hours to every four hours, as necessary, are the best drugs. Aromatic spirits of ammonia, in fifteen-drop doses, may tide over an emergency. She also needs a cardiac tonic to strengthen and build up the heart wall. Digitalis is the best of the cardiac tonics. Five drops of the tincture every four hours will be none too much for her at present. If the digitalis takes hold, the strychnia and caffein may be diminished or omitted. She should be fed every two hours with small amounts of milk and soft solids, such as custard, junket, smooth cereals, blanc mange and ice cream.

The results of the treatment of whooping-cough are at best most unsatisfactory. To do good, the drugs must be given up to their physiological limit. In such doses they will certainly do harm in this instance. If the lungs are not too much filled up, there is no objection to giving morphia, in doses of from one thirty-second to one twenty-fourth of a grain, to control excessive cough, nervousness, sleeplessness and discomfort.

CASE 58. Michael D., seven years old, went to school on the morning of January 24 perfectly well, as far as was known, except that his bowels had not moved for nearly a week. While playing at recess one of his playmates struck him in the abdomen with his fist. Shortly afterward he became faint and nauseated and was sent home by his teacher. He vomited soon after reaching home and continued to do so for twenty-four hours. He was given two grains of calomel in divided doses during the afternoon and night of the 25th, and a teaspoonful of Epsom salts the next morning, but his bowels had not moved. He continued to complain of nausea, headache and pain in the abdomen. The abdominal pain was general, not localized. He had coughed a little since the morning of the 26th. He had felt very hot, but his temperature had not been taken. He had not been delirious. He was seen about 4 P.M., January 26.

Physical Examination. He was fairly developed and nourished. He was perfectly clear mentally. The cheeks were flushed. His face was not pinched. The alæ nasi moved with respiration. The tongue was moist and moderately coated. The throat was slightly reddened, but was otherwise normal. The cardiac impulse was in the fifth space, just inside the nipple line. The right border of dullness was 1 cm. to the right of the right sternal border, the upper border at the middle of the third rib. The sounds were normal. The second pulmonic sound was somewhat the louder. There was slight dullness in the right back below the angle of the scapula with slightly diminished respiration of normal character. The vocal resonance and fremitus were normal. There were no râles. The upper border of the liver flatness was at the upper border of the sixth rib, the lower border was not palpable. The spleen was not palpable. The level of the abdomen was considerably above that of the thorax; it was everywhere tympanitic. There was no muscular spasm, but the whole abdomen was somewhat tender, the tenderness being most marked in the right iliac fossa. There was, however, no tumor or dullness in this region. There were no evidences of free fluid in the abdomen. The extremities were normal. There was no spasm or paralysis; the knee-jerks were equal and diminished;

there was no Kernig's sign. There was no enlargement of the peripheral lymph nodes. Rectal examination showed nothing abnormal beyond a mass of hard feces in the rectum. The rectal temperature was 104° F., the pulse 140, the respiration 60.

The urine was high in color, extremely acid in reaction, and of a specific gravity of 1,030. It contained no albumin or sugar, but a large excess of urates. The sediment showed nothing abnormal.

The leucocyte count was 36,000.

Diagnosis. The history of the acute onset of vomiting and pain in the abdomen immediately after a blow in that region makes some acute inflammatory condition in the abdomen seem the most obvious diagnosis. The persistent constipation, the continuance of the pain and the abdominal distention and tenderness all corroborate this diagnosis. The greater tenderness in the right iliac fossa points to an involvement of the appendix. Further consideration, however, makes this diagnosis seem less probable. The absence of the pinched face, of free fluid in the abdomen and of muscular spasm makes general peritonitis very improbable. The absence of localized spasm, tumor and dullness in the right iliac fossa and the negative results of the rectal examination practically rule out appendicitis. The blow of another small boy could hardly rupture any organ, there was no collapse and there are no signs of peritonitis, as would be expected if any organ had been ruptured fifty-three hours before. The condition of the urine also counts against any injury to the kidney. The history of constipation before the injury and the mass of hard feces in the rectum suggest that constipation may be the cause of the abdominal symptoms, and that they, and perhaps the blow as well, may be purely coincidences and that the real trouble is located somewhere else.

The cough suggests some trouble in the lungs. It is a well-known fact that the pain in pneumonia is often referred by children to the abdomen and that distention of the abdomen is very common in pneumonia at this age. Localized diminution of the respiratory sound is often the earliest sign of pneumonia. When associated with dullness, as in this instance, it

is most suspicious. The relative increase in the rate of the respiration over that of the pulse ($2\frac{1}{3}$ to 1 instead of the normal 4 to 1) in an acute disease with a high temperature is almost pathognomonic of pneumonia. The motion of the alæ nasi, while it points toward trouble in the respiratory tract, does not necessarily mean that that trouble is pneumonia. Motion of the alæ nasi is, moreover, not uncommon when there are inflammatory processes in the abdomen. It is, therefore, not of much diagnostic importance in this instance. The flushing of the cheeks is merely a sign of fever and is not especially suggestive of pneumonia, as is often supposed. The diminution of the knee-jerk is of but little importance, but nevertheless is another point in favor of pneumonia. The high leucocyte count is characteristic of pneumonia, but is not inconsistent with an inflammatory process in the abdomen and hence is of practically no importance in the differential diagnosis. The points in favor of pneumonia are so much more numerous and fit together so much better than do those in favor of an inflammatory process in the abdomen that a positive diagnosis of PNEUMONIA is justified. The abdominal symptoms are presumably in part due to the constipation and in part secondary to the pneumonia. The blow was purely a coincidence.

Prognosis. The prognosis of pneumonia in children is, on the whole, very good. He is a strong boy and at present is not any sicker than he would be expected to be. His chances ought to be at least as good as the average. He can be confidently expected to recover. A certain number of children with pneumonia are unfortunate enough to develop empyema. He may or may not be one of these. It is impossible to tell.

Treatment. The most important part of the treatment is to give him a large supply of fresh air. All the windows in his room should be wide open. He can be protected from the wind, if necessary, by a screen. This being January, he must be warmly covered and will probably need a cap and heaters, perhaps mittens. If he is treated in this way his fever will, in all probability, not require any treatment. Applications to the chest, whether poultices, cotton jackets or mud, can

have no effect on the pneumonic process, tend to overheat the patient and, if heavy, interfere with the respiration by their weight. There are no drugs which have any effect on the pneumonic process. His heart is strong. Medicinal treatment is, therefore, contra-indicated.

The vaccine treatment of pneumonia is, in the author's opinion, irrational and, consequently, unjustifiable. Cough is not likely to be troublesome if he gets plenty of fresh air. If it is, and there is no edema of the lungs or bronchitis, heroin, in doses of from one twenty-fourth to one twelfth of a grain, will probably make him more comfortable and not do any harm. He should be fed once in three hours with milk and soft solids, such as simple cereals, custard, blanc mange, ice cream and milk toast. Care should be exercised in giving him milk because of the constipation.

The constipation will probably be relieved by low enemata of suds. If they are not sufficient, high enemata of suds, oil or glycerin may be tried. If these are unsuccessful, a tablespoonful of castor oil or two teaspoonfuls of syrup of senna will probably be effectual.

CASE 59. Matthew L., twenty-six months old, had always been unusually strong and vigorous, but very nervous and excitable. He had had a little "cold in the head" for two or three days, but had not seemed at all sick. The appetite was rather poor, February 19, and consequently he was not given as much to eat as usual. His bowels moved normally just before he went to bed. He was very restless and feverish all night and toward morning vomited several large curds of milk. He had a severe convulsion about 8.30 A.M. on the 20th. The colon was washed out and a considerable amount of well-digested, yellow feces obtained. He was given two tablespoonfuls of castor oil, which resulted in three large, loose, yellow movements which contained a little undigested food. He had no more convulsions, but twitched a little from time to time. He coughed occasionally, and moving, coughing and crying seemed to hurt him. The rectal temperature had ranged between 104° F., and 104.5° F. He was seen in consultation at 9 A.M., February 21.

Physical Examination. He was well developed and nourished. Pallor was marked and there was a slight tinge of cyanosis about the lips. He was perfectly conscious, but restless and irritable. There was a slight tendency to rigidity and he twitched occasionally. There was no stiffness or tenderness in the neck. The pupils were equal and reacted to light. The alæ nasi moved with respiration. The ear drums were normal. The tongue was moderately coated. The throat was normal. The heart and lungs were normal. The liver and spleen were not palpable. The extremities were normal. There was no definite spasm of the extremities and no paralysis. The knee-jerks were equal and slightly diminished. Kernig's sign was absent. There was no enlargement of the peripheral lymph nodes, and no eruption. The rectal temperature was 104.6° F., the pulse 140, the respiration 70. The leucocytes numbered 24,000.

Diagnosis. The persistence of the high temperature in spite of the thorough emptying of the bowels, the practically normal character of the movements and the cessation of the vomiting rule out all affections of the gastro-intestinal tract. The absence of sore throat and eruptions rules out tonsillitis

and scarlet fever, while the absence of catarrhal symptoms and the leucocytosis exclude influenza. The initial convulsion and the persistence of twitching, together with the slight tendency to rigidity, suggest, to a certain extent, some form of meningitis, more probably the cerebrospinal. The normal mental condition and the absence of all physical signs of meningeal irritation, unless the twitching and tendency to rigidity be such, practically exclude meningitis. An initial convulsion, moreover, is not uncommon at the onset of any acute disease in childhood, and a high temperature often causes twitching and a tendency to rigidity in nervous children. These points do not count much, therefore, in favor of meningitis. The continued high temperature, the slight cough, the pain on motion, cough and crying, and, more than all, the much greater increase in the rate of the respiration than in that of the pulse (2 to 1 instead of the normal 4 to 1), make the diagnosis of PNEUMONIA practically certain in spite of the absence of physical signs in the lungs. The movement of the alæ nasi, the slight tinge of cyanosis about the lips and the diminution of the knee-jerks, although not of much importance, are corroborative of this diagnosis, while the leucocytosis is consistent with it.

Prognosis. The prognosis of pneumonia in childhood is very good. In infancy, however, it is a far more serious disease. This boy has always been strong and well, is in good general condition and probably will not have much lung involved. The symptoms of nervous irritability do not make the outlook any less favorable. The chances are, therefore, very much in favor of his recovery.

Treatment. See Case 58. The windows must be kept wide open, day and night. The cool, fresh air will probably lower the temperature somewhat, and thus diminish the nervous symptoms. If they persist, the temperature must be reduced by bathing. The coal-tar products should never be used in pneumonia, either to reduce the temperature or to relieve nervous symptoms. The temperature needs to be reduced, not because it is 104.6° F., but because in this instance this degree of temperature causes nervous symptoms. If it did not, it would not be necessary to treat it. Sponge

baths of alcohol and water, equal parts, at 90° F., will probably be sufficient to control it. If they do not, fan baths will almost certainly be effectual. Fan baths are given in this way: The patient is stripped and wrapped in cheesecloth. This is then wet with water at 100° F. and the patient fanned. The temperature is reduced by the evaporation of the water. The cheesecloth is wet from time to time as the water evaporates. Children seldom object to this form of bath. If this is ineffectual, he may be given a cold pack at from 60° F. to 70° F. Children seldom bear tub baths well, and it is, as a rule, wiser not to use them. If necessary, he may be given sodium or potassium bromide, in doses of from three to five grains, from time to time. There is no indication for stimulation at present.

CASE 60. David K., eight years old, had had the measles when a baby. Since then he had always been well. August 20 he began to complain of a little pain in his lower left chest, which was worse when he ran or played. August 22 he began to have a little cough, which was dry and not accompanied by pain. After the beginning of the cough the pain in the chest ceased, his appetite became poor and he acted weak and tired. His mother said that he wanted to sit alone by himself instead of playing with the other children. She thought that he had been feverish and said that he had sweat profusely at night. He was first seen August 30.

Physical Examination. He was well developed and nourished, but somewhat pale. There was no dyspnea, except on exertion. The tongue was moist with a moderate white coat in the center. The throat was normal. The cardiac impulse was visible in the fourth space in the left parasternal line. The right border of the relative cardiac dullness was about two thirds of the distance from the right border of the sternum to the right nipple. The upper border of the relative cardiac dullness was at the lower border of the second rib. The heart sounds were normal in character, but louder to the right of the sternum than to the left. The second pulmonic sound was considerably louder than the second aortic. The left chest moved somewhat less in respiration than the right. The intercostal spaces were the same on both sides. There was dullness in the left back from the spine to the angle of the scapula, below which there was flatness. The whole left axilla was flat. There was dullness in the left front from the upper border of the third rib to the upper border of the fourth rib, below which there was flatness. There was dullness in Traube's space. The respiration was loud and bronchial below the upper level of dullness, both in back and in front. The voice sounds were increased; the vocal fremitus diminished. No râles were heard. Above the level of dullness the respiration and voice sounds were normal in character and a few fine moist râles were heard. There was a marked sense of resistance over the dull and flat areas. There was exaggerated vesicular resonance over the whole right chest. The respiration was loud and distinctly puerile. The voice sounds and

fremitus were normal. No extraneous sounds were heard. The upper border of the liver flatness in the nipple line was at the upper border of the seventh rib. The lower border of the liver was palpable 2 cm. below the costal border. The spleen was not palpable. The dullness was not determined because of the dullness in the left chest. The abdomen showed nothing abnormal. The extremities were normal. There was no spasm or paralysis and the knee-jerks were equal and normal. There was no enlargement of the peripheral lymph nodes. The mouth temperature was 101.2° F., the pulse 130 and the respiration 48.

Diagnosis. The trouble is, of course, located in the left chest. The only question is whether there is solidification of the lung or an effusion into the pleural cavity. If the trouble is in the lung, it is, judging from the history, more probably tubercular than pneumonic. The diminution in the motion of the left chest and the mere presence of dullness or flatness are of no importance in differential diagnosis. The points in favor of solidification of the lung are the normal level of the intercostal spaces, the loud bronchial respiration and the increased voice sounds. The intercostal spaces are, however, often level in childhood, even when there is considerable fluid in the pleura, because the elastic chest gives as a whole, while in the adult the rigid chest wall does not give and the intercostal spaces yield. Theoretically, the respiration and voice sounds ought not to be transmitted through fluid; practically, they often are in childhood. The explanation is presumably to be found in the elasticity of the thoracic wall at this age. The bronchial character of the respiration in pleural effusion is due to the compression of the lung. The points in favor of consolidation of the lung are, therefore, not as important as they at first appear.

The points in favor of a pleural effusion are the distribution of the dullness and flatness, which follows gravity rather than the lobes of the lung, the displacement of the heart to the right, the dullness in Traube's space (which means depression of the diaphragm), the diminished fremitus, the absence of râles and the marked sense of resistance. The distribution of the dullness and flatness is not of quite as much importance

in this instance as it usually is, because the trouble, being tubercular, would not be as likely to be lobar in its distribution as would a pneumonia. It may be argued that, if the diaphragm is depressed, the spleen ought to be palpable. The location of the spleen is such, however, that depression of the diaphragm does not displace it. The displacement of the heart and diaphragm is positive proof of the presence of a pleural effusion. The marked sense of resistance is almost positive proof of effusion, as this is practically never felt to the same extent over a solid lung. The diminished fremitus and the absence of râles are of much less importance, as they can be explained in other ways.

The accentuation of the second pulmonic sound is, of course, due to the increased pressure in the pulmonary circulation. The physical signs in the right chest are characteristic of compensatory emphysema. The upper border of the liver flatness is as much below the normal level as the lower border is below the costal margin, showing that the liver is not enlarged, but merely displaced downward.

The next point to be decided is whether the effusion is serous or purulent. The effusion in this instance is, judging from the history, primary, that is, it is not secondary to some other acute disease. Primary pleurisy at this age is almost always serous; secondary, almost always purulent. The sweating is merely a sign of weakness and does not count at all in favor of a purulent effusion. The temperature is consistent with either condition. There is nothing about the physical signs which is of any value in differential diagnosis. A leucocyte count would probably be of considerable assistance in diagnosis because there is almost never a leucocytosis with a primary serous effusion, and almost always a marked leucocytosis when the fluid is purulent. The absence of leucocytosis in primary serous effusions is presumably due to the fact that they are almost invariably tubercular. The only positive method of diagnosis is exploratory puncture. It is reasonably safe to make a diagnosis of SEROUS PLEURISY in this instance, however, on the history.

A skin tuberculin test will aid much in determining whether or not the effusion is or is not tubercular. A more certain

method, however, is by the examination of the fluid obtained by exploration or aspiration. There are, as a rule, a large excess of lymphocytes in the tubercular cases, and of polynuclear cells in the acute infectious variety. If the fluid is digested before the examination (inoscopy), tubercle bacilli can be found in a large proportion of the tubercular cases; in fact, more positive results are obtained in this way than by animal inoculations.

An exploratory puncture was done and a serous fluid, which contained an excess of lymphocytes and a few tubercle bacilli, was obtained.

Prognosis. There is no danger to life from the effusion if it is not allowed to accumulate enough to cause symptoms of pressure. It is not an especially serious form of tuberculosis. The prognosis is, therefore, that of tuberculosis in general.

Treatment. The effusion is not causing any symptoms from pressure on other organs. It is, therefore, wiser not to withdraw it at present. Applications to the chest wall are useless. It is unreasonable to expect that diuretics and cathartics will draw the fluid from the pleural cavity, in which the pleura is inflamed and not in a condition to absorb fluid, rather than from the tissues. They cannot be of use, anyway, unless liquids are excluded from the diet. It is very unwise to cut liquids out of a child's diet, and, moreover, free catharsis is very weakening. They cannot, therefore, do much, if any, good, and are almost certain to do harm by interfering with the ingestion of food and weakening the patient. They ought not to be used in this instance. If the fluid increases enough to cause symptoms of pressure, or if it does not begin to diminish after ten days or two weeks, it should be withdrawn. If the chest refills, the aspiration may have to be repeated several times.

He must be kept quiet in bed and well fed. The further treatment is that of tuberculosis in general.

CASE 61. Sophy L. was seen in consultation when four and one-half years old. She had always been delicate. Seven and one-half weeks previously she was taken suddenly ill with a pneumonia involving the whole left lower lobe. She was under the care of Dr. G. for a week. The crisis did not occur during this time. Dr. G. was then discharged and another doctor called in. The crisis is said to have occurred on the eighth or ninth day. A week later Dr. G. was again given charge of the case. He found the temperature running between 103° F. and 104° F. It dropped a little after a few days and since then had ranged between 101° F. and 102° F. She had had no chills, but had sweat freely, especially about the head. She was not short of breath and did not complain of pain. She coughed occasionally. Her appetite was good, but she was somewhat constipated. She had lost weight steadily. She had been up and about the house for ten days. An examination of the sputum for tubercle bacilli had been negative.

Physical Examination. She was slight, thin and somewhat pale. There was no cyanosis. She cried loudly without distress. The cardiac impulse was palpable just to the left of the sternum. The impulse was also palpable to the right of the sternum and was stronger there than on the left. The cardiac dullness extended from 2 cm. inside the right nipple to 1 cm. to the left of the left border of the sternum. The heart sounds were louder to the right than to the left of the sternum. The sounds were not abnormal. The left side of the thorax appeared larger than the right, and moved much less than the right in respiration. The left intercostal spaces were nearly obliterated. There was flatness in the left chest above the third rib in front, the fifth in the axilla and the mid-scapula behind. In this area respiration was bronchial, and the voice sounds and fremitus slightly increased. Below the flat area down to the fifth space in front, the sixth space in the axilla and in the whole back there was flat tympany. Below this there was loud tympany. In these areas respiration was diminished, but almost vesicular in character. The voice sounds were diminished, but not changed in character. The vocal fremitus was absent. There was tympany in

Traube's space. There was a very marked sense of resistance over the whole left chest, more marked in the lower portion than in the upper. The right chest was somewhat hyperresonant, except that there was a triangular area of dullness in the back, the apex being at the level of the spine of the scapula, the side along the back bone and the base along the tenth rib, extending outward about two inches. The respiration was of normal character, but louder than normal over the whole right side. The upper border of the liver flatness was at the upper border of the sixth rib; the lower border was palpable 4 cm. below the costal border in the nipple line. The spleen was not palpable. The abdomen was rather full, but not tense or tender. The extremities showed nothing abnormal. There was no general enlargement of the superficial lymph nodes. The rectal temperature was 100° F., the pulse 120, the respiration 35.

Diagnosis. The history is so characteristic of an empyema secondary to pneumonia that it hardly seems necessary to consider anything else, unless the physical examination proves this supposition to be wrong. Other remote possibilities are an unresolved pneumonia, an acute tubercular pneumonia which has changed to a chronic condition, and a secondary tubercular infection consecutive to a pneumococcus pneumonia.

The physical signs are, however, confusing. The marked displacement of the heart to the right, the enlargement of the left chest, the obliteration of the left intercostal spaces, and the triangular area of dullness in the right back (Grocco's sign) prove that there is something in the left pleural cavity. The tympany in the lower portion suggests that this may be air. The marked sense of resistance proves that it is fluid. It would be almost unheard of, moreover, to have fluid or solid lung in the upper part of the chest and air alone in the lower. The tympanitic sound is undoubtedly transmitted from the abdomen, and the vesicular respiration and normal voice sounds from the right side. The bronchial respiration and increased voice sounds and fremitus in the upper portion suggest strongly that the upper half of the chest is filled by solid lung. The marked sense of resistance and the marked

displacement of the heart, together with the well-known fact that in children the respiration and voice sounds, and sometimes even the fremitus, may be transmitted through fluid if the tension is high enough, show conclusively that the upper as well as the lower portion of the chest is filled with fluid. The bronchial character of the respiration is due to the compression of the lung, which is presumably squeezed into a small mass at the root. The tympany in Traube's space is probably also transmitted from the abdomen and does not mean that the diaphragm is in its normal position.

The signs in the right chest are characteristic of a compensatory emphysema. The upper border of the liver flatness is slightly lower than normal, but not as much so as the lower border. This shows that the liver is enlarged. The enlargement is probably due to fatty change, resulting from malnutrition and toxic absorption, although it may possibly be amyloid.

There is undoubtedly fluid in the left pleural cavity. This fluid accumulated after pneumonia, and the patient is a child. The chances are, therefore, at least nineteen out of twenty that it is purulent rather than serous. The absence of chills does not count against, nor the presence of sweating for, a purulent effusion, because chills are rather unusual with an empyema at this age, and sweating is common in all conditions of weakness. The diagnosis of PURULENT PLEURISY is, therefore, justified without an exploratory puncture.

Prognosis. If the chest is not opened she will almost certainly fail steadily and finally die. There is, however, a small chance that the pus may eventually find a way out for itself or become encapsulated and absorbed. In either case, she is certain to be left with a very greatly deformed chest. If the chest is opened at once she will almost certainly recover, because her general condition is surprisingly good under the circumstances and the evidences of septic absorption comparatively slight. It is six weeks since the appearance of the effusion, it is very large, the lung is much compressed and probably more or less bound down by adhesions. The chances are, therefore, that it will not fully expand and that she will be left with some deformity.

Treatment. The only rational treatment in this instance is the opening and draining of the pleural cavity. It is true that in rare instances recovery ensues in pneumococcus empyema after tapping. This happens so seldom, however, that it cannot be regarded as a justifiable procedure. The almost invariable result is that the pus reaccumulates and that the chest has to be finally opened. In the meantime the general condition has been further impaired as the result of the continued septic absorption, and the lung has been further compressed and its complete expansion rendered more difficult. The long duration and the large amount of the effusion in this instance make the chances of cure from aspiration even less than the average. She should, therefore, be operated on at once. The author believes that resection of a rib gives much better results than simple incision. A resection should certainly be done in this instance because, on account of the duration of the process, there are probably large clots and masses of caseous material which could not be satisfactorily cleaned out through an incision.

SECTION VII.

DISEASES OF THE HEART AND PERICARDIUM.

CASE 62. Dillaway F., the second child of healthy parents, was delivered by version at full term, was apparently normal at birth and weighed seven and one-half pounds. He was very badly fed during his first year and suffered from indigestion during his second year. A murmur was discovered in his heart during a routine examination when he was ten months old. When he was two years old he had influenza, followed by pneumonia. Since then he had been well, except for symptoms of adenoids and occasional nosebleeds, which were probably due to them, until the last few months, during which he had had a recurrence of his indigestion. He was seen when four years old. He had never been short of breath or cyanotic.

Physical Examination. He was fairly developed and nourished and looked well. His color was good, but when he cried there was, perhaps, a slight tinge of cyanosis in the cheeks. His throat was normal, his tongue moderately coated. There was no deformity of the chest. The cardiac impulse was visible and palpable in the fifth space in the nipple line, $6\frac{1}{2}$ cm. to the left of the median line (normal is in fourth space, 6 cm. to left of median line). The left border of the relative cardiac dullness corresponded to the impulse. The upper border of the relative dullness was at the upper border of the second rib (normal is in the second space), and the right border 3 cm. to the right of the median line (normal is $2\frac{1}{2}$ cm.). There was no dullness under the manubrium. The action was regular; the rate, 90 (normal). A very distinct thrill was felt in the second left interspace. It was also palpable, but much less distinctly, over the rest of the precordia. The first sound was everywhere distinct, but was followed over the whole precordia by a loud, rough murmur, loudest in the second left interspace. This murmur was also audible in the

neck and over the whole chest, back and front. The second pulmonic sound was much louder than the second aortic, so much louder that it was undoubtedly accentuated. The lungs and abdomen were normal. The liver and spleen were not palpable. The extremities were normal. There was no clubbing of the fingers or toes. There was no spasm or paralysis. The knee-jerks were equal and normal. There was no enlargement of the peripheral lymph nodes.

Diagnosis. This boy undoubtedly has a cardiac lesion. The first thing to be decided is whether it is congenital or acquired; next, to determine, if possible, what the lesion is. The points in favor of a congenital lesion in this instance are the fact that the murmur was discovered when he was only ten months old, before he had had any disease likely to be accompanied by endocarditis; the slight enlargement of the heart in comparison with the intensity of the murmur; and the location of the greatest intensity of the murmur and of the thrill and their distribution, which do not correspond to those of any of the acquired lesions. The points against a congenital lesion are the absence of bulging of the precordia and of all the usual signs of interference with the oxygenation of the blood. There is, however, no reason for bulging of the precordia when the heart is no more enlarged than in this instance, and it is perfectly possible to have congenital lesions which from their nature, or from the presence of compensatory lesions, do not interfere with the oxygenation of the blood. A positive diagnosis of CONGENITAL HEART DISEASE is, therefore, justified.

It is impossible during life to make a certain diagnosis of the exact lesion in congenital heart disease, although a probable diagnosis is often possible. In this instance the location of the maximum intensity of the murmur and of the thrill in the second left interspace and the transmission of the murmur into the neck point strongly to a narrowing of the pulmonic orifice. The absence of all signs of deficient oxygenation of the blood shows that there must be some compensatory lesion. The accentuation of the second pulmonic sound suggests that this lesion is an open ductus arteriosus.

Prognosis. He has reached the age of four years and has

passed through a pneumonia without the appearance of any symptoms referable to the heart, has perfect compensation with but little cardiac enlargement, and has developed normally. It seems reasonable to suppose, therefore, that his cardiac lesion will not interfere with his growth and development and that he will reach adult life and perhaps attain old age. The prognosis in this instance is as good, if not better, than it would be if he had an acquired lesion.

Treatment. He requires no treatment at present, except that it will be advisable for him to avoid continued, excessive exertion. If failure of compensation develops, the treatment will be that of failure of compensation in general.

CASE 63. William C.'s father had died of tuberculosis just before he was born. He had had no known exposure to tuberculosis. He had been unusually rugged until he was eight years old, when he had otitis media followed by inflammation of the mastoid and operation. A considerable amount of adenoids was removed at the same time. He was kept out of school for a year, but did not regain his strength. He was easily tired and not nearly as vigorous as before. An enlargement of several of the cervical lymph nodes, which had developed at the time of the mastoid operation, persisted until his tonsils were removed, when he was ten and one-half years old, since when they had become much smaller. He had chicken-pox when eleven and one-half years old and was considerably pulled down by it. Since then he had been generally below par and very easily tired. His appetite had been poor, but he had shown no signs of indigestion. His bowels had moved regularly, and the movements had been normal. He had had no cough. He complained a little of shortness of breath on exertion, but never of palpitation. Once, after unusual exertion, and at another time after getting tired, he had run a temperature between 99° F. and 100° F. for several days. At other times his temperature had been normal. He had been kept very quiet during the last few months and not allowed to take any active exercise. He went to bed early and usually slept about eleven hours, but had no rest during the day. He had grown tall very rapidly during the last six months. He was of a very nervous type and was much worried about himself. He had no bad habits. He was seen when eleven and three-fourths years old.

Physical Examination. He was tall and rather slight, but of fair color. His throat and mouth were healthy and his tongue nearly clean. There was no venous hum in the neck. The cardiac impulse was palpable in the fourth left space, $7\frac{1}{2}$ cm. to the left of the median line. The left border of the relative cardiac dullness was $7\frac{1}{2}$ cm. to the left, and the right border 3 cm. to the right of the median line; the upper border was at the upper border of the third rib. That is, taking his height into consideration, the measurements to the left were a little small, while the others were normal. The cardiac

action was somewhat irregular in rhythm; the rate, 88. The cardiac action was steadied by exertion. The first sound was everywhere of fair strength. It was at times followed, both at the pulmonic and mitral areas, by short murmurs which were not transmitted. The second pulmonic sound was not accentuated. The lungs and abdomen were normal. The liver and spleen were not palpable. The extremities were normal. There was no spasm or paralysis. The knee-jerks were equal and lively. Kernig's sign was absent. Numerous lymph nodes, varying in size from that of a pea to that of a large bean, were palpable in the neck. There was no enlargement of the axillary and inguinal and no evidence of enlargement of the bronchial lymph nodes. His weight was eighty-nine and one-fourth pounds (average, seventy-six and one-half pounds). His height was fifty-nine and three-fourths inches (average, fifty-five).

The urine was clear, highly acid in reaction, of a specific gravity of 1,038 and contained no albumin or sugar.

Blood.

Hemoglobin,	90%
Red corpuscles,	4,500,000
White corpuscles,	7,200

Smears of the blood showed nothing abnormal in either the red or the white corpuscles.

Diagnosis. The enlargement of the cervical lymph nodes is in all probability not tubercular, because it came on in the course of an acute disease, has never shown any tendency to suppurate and has diminished in size since the tonsils were removed. The fact that his father died of tuberculosis is of no importance, because he was not exposed to tuberculosis from him. There are no evidences of tuberculosis elsewhere. It is reasonably safe to conclude, therefore, that his poor condition is not due to tuberculosis.

The point of chief interest is the condition of the heart. It is certainly not an acute one. Is the trouble organic or functional? Anemic murmurs do not have to be considered because of the condition of his blood and the absence of a venous hum in the neck. The absence of enlargement of the

heart, taken in combination with the strong first sound and the absence of accentuation of the second pulmonic sound, show that there is no dilatation or hypertrophy of the heart, which would certainly be present if there was any chronic leakage at the mitral orifice. The presence of a murmur at the pulmonic orifice and the absence of transmission of the murmurs is also against an organic lesion. The steadying of the heart on exertion, the rapid growth, the nervous temperament, the history of the previous illnesses and the fact that he is about the age of puberty, all point to a functional condition. It is safe to conclude, therefore, that the CARDIAC condition is FUNCTIONAL, not organic.

Prognosis. The prognosis is perfectly good with time. It will probably be several years before he will be strong and vigorous. The irregularity of the heart and the murmurs will probably disappear much sooner.

Treatment. The treatment must be by regulation of his daily life, not by drugs. In the first place, he must be assured that there is nothing serious the matter with him, that his weakness is merely the result of his illness and his rapid growth and that he will surely be all right again. He must not go to school more than half a day. If he does not go at all, he will have too much time to think about himself. He must be amused in quiet ways. He must partly undress and lie down for an hour at noon and rest, even if he does not sleep. He must be in bed at eight. It will be a good thing for him to sleep out of doors. He can walk, drive, ride in an automobile, play golf and work a little about the house, but must not play baseball or football, ride a bicycle or skate. He may have any reasonable food. He should have three good meals and a lunch in the morning. Care must be taken that his bowels move regularly. Tincture of nux vomica, in eight-drop doses, three times daily, before meals, will probably improve his appetite and his general condition.

CASE 64. Ernest M., nine years old, was admitted to the Children's Hospital January 5, on the sixth day of a pneumonia of the left lower lobe. He was in good condition and the physical examination showed nothing else abnormal. The

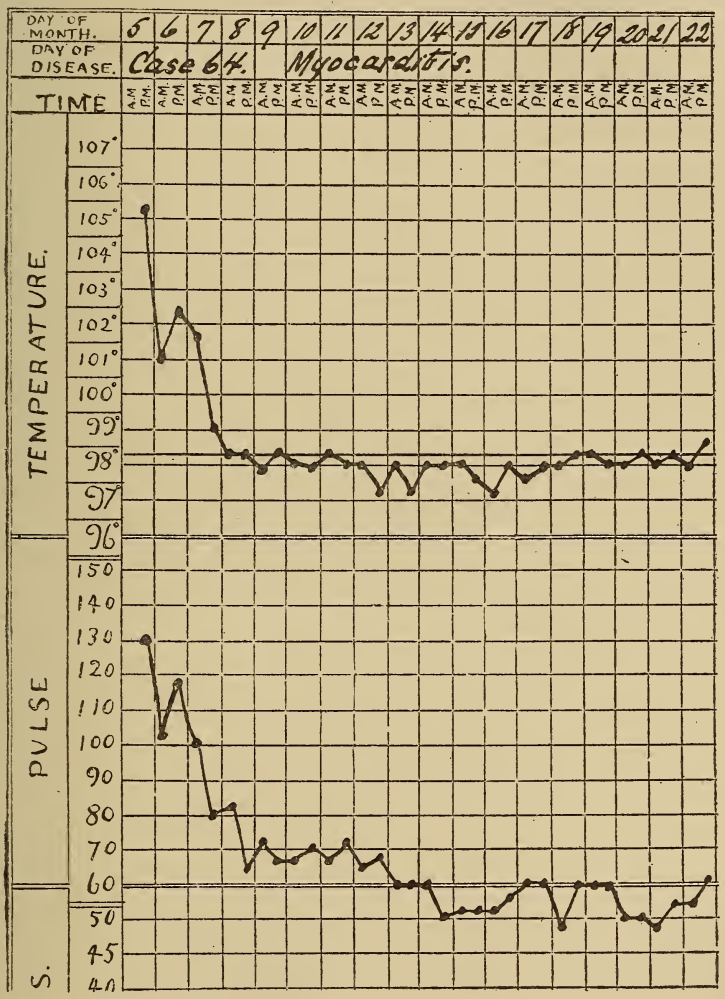

Fig. 6. Ernest M. Case 64.

cardiac impulse was visible and palpable in the fifth space, 7 cm. to the left of the median line and just inside the nipple line. The upper border of the relative cardiac dullness was at the upper border of the third rib; the left border corre-

sponded to the impulse and the right border was $2\frac{1}{2}$ cm. to the right of the median line (all normal). The action was regular. The first sound was of fair quality. The second sounds were alike. There were no murmurs.

The crisis, as will be seen by the chart, occupied two days. The temperature reached normal the afternoon of January 7. The pulse remained good during the crisis. The temperature remained down and the lung began to clear at once, but the pulse became infrequent and irregular the night of the 8th. The examination the next morning, January 9, was as follows:

Physical Examination. He was perfectly comfortable and of good color. The cardiac impulse was wavy and visible in several spaces. It was most distinctly palpable in the fifth space, $8\frac{1}{2}$ cm. to the left of the median line. The upper border of the relative cardiac dullness was in the second space, the left border was just outside the point of maximum impulse and the right was 4 cm. to the right of the median line. The action was irregular in both force and rhythm; the rate was 68 (normal is 80 to 90). All the beats were transmitted to the wrist. The first sound was everywhere short and somewhat feeble. The second sounds were alike. There were no murmurs. There was still a little dullness and a few moist râles over the left lower lobe. The physical examination showed nothing else abnormal.

Diagnosis. The physical signs are those of weakness and dilatation of the heart. The weakness and dilatation cannot be the results of an endocarditis, because the heart was normal four days before and no leakage which did not show then could possibly have caused so much dilatation and weakness in four days. There is no cause outside of the heart to account for its sudden failure. The cause of the dilatation and weakness must, therefore, be in the heart wall. That is, there is a MYOCARDITIS. The diminution of the second sound at the pulmonic area at entrance (the second pulmonic sound is normally louder than the second aortic at this age) showed that the right ventricle was unable to meet the increased resistance in the pulmonary circulation and gave warning of what happened later.

Prognosis. The prognosis is a grave one. A marked

diminution in the pulse-rate in myocarditis is as serious, if not more so, than a marked increase in the rate. He may die at any time; he may slowly improve and finally recover entirely. It is impossible to forecast what will happen. The outlook depends to a considerable extent on the treatment.

Treatment. The most important part of his treatment is quiet. He must be kept perfectly flat and not allowed to sit up for any reason whatever. He must be kept flat, or nearly flat, until the cardiac action and rate are normal and all signs of dilatation and weakness have disappeared. He may then begin to gradually get up and about. Alcohol is useless in myocarditis, except as a food. In large doses it undoubtedly does harm. Strychnia may possibly help some. Digitalis cannot act on a degenerated muscle. Nitroglycerin is dangerous because it predisposes to vasomotor paralysis. There is, therefore, no drug treatment indicated at present. He may have liquids in moderate amounts, soft solids and eggs. It will be wiser to give him small meals five or six times in the twenty-four hours than large ones at longer intervals.

CASE 65. Samuel C., four and one-half years old, had been perfectly well since an attack of acute nephritis two years before. About two weeks before he was seen he began to complain of pain and stiffness in the ankles, wrists and elbows. He apparently did not feel sick and was not feverish. He had been allowed to be out of doors as usual, although it was winter. He had had no treatment. The day he was seen he had not seemed quite as well, although nothing very definite had appeared. He was seen in the evening.

Physical Examination. He was well developed and nourished and of good color. He did not seem sick. He complained of slight pain when his ankles, wrists and elbows were moved. The right wrist was tender on pressure; the other joints were not. There was no redness, heat or swelling about any of them. The cardiac impulse was visible and palpable in the fifth space, 8 cm. to the left of the median line (the normal is in the fourth space, 6 to $6\frac{1}{2}$ cm. to the left of the median line). The upper border of the relative cardiac dullness was at the lower border of the second rib (normal is in second space), the right border $2\frac{1}{2}$ cm. to the right of the median line (normal), and the left border 8 cm. to the left of the median line (normal is 6 to $6\frac{1}{2}$ cm.). The cardiac action was somewhat irregular; the rate was 104 (normal is 90 to 100). The first sound at the apex was strong, but continued into a short, blowing murmur, transmitted into the axilla. The second sound at the apex was reduplicated. The second sound at the pulmonic area was accentuated. The lungs and abdomen were normal. The liver and spleen were normal. There was no spasm or paralysis. The knee-jerks were equal and normal. There was no enlargement of the peripheral lymph nodes. There was no venous hum in the neck. The mouth temperature was 102° F.

Diagnosis. The history and the conditions found in the joints are typical of RHEUMATISM in childhood, at which age marked joint and constitutional symptoms are very uncommon. The disease is, therefore, very often overlooked, as it was in this instance. Unfortunately the heart is involved even more frequently in this mild type of rheumatism in childhood than it is in the severe type in adult life.

There is undoubtedly something abnormal about the heart. The possibilities are acute endocarditis, myocarditis and an anemic murmur. The latter can be at once excluded on the good color, the absence of a venous hum in the neck and the enlargement of the heart. The absence of a murmur at the pulmonic area is also against it. Myocarditis can be ruled out on the character of the impulse, the strength of the first sound and the accentuation of the second sound in the pulmonic area. The absence of enlargement to the right and of much increase in the rate of the pulse is also against it. The diagnosis is, therefore, by elimination, ACUTE ENDOCARDITIS of the mitral valve. The combination of a systolic murmur at the apex with a strong impulse, strong first sound, but little increase in the rate of the heart, enlargement limited to the left side and an accentuation of the second pulmonic sound, is, moreover, characteristic of an early endocarditis of the mitral valve.

Prognosis. There is no immediate danger to life from the endocarditis, the chief immediate danger being the simultaneous involvement of the myocardium and pericardium. When all parts of the heart are involved, the prognosis is always a grave one. There is, however, very little chance of complete recovery. The disease is almost certain to result in permanent deformity of the mitral orifice. There is, moreover, great danger of recurrence of the rheumatism in the future with further damage to the endocardium. It must be remembered in this connection that the murmurs due to acute endocarditis frequently disappear, to be followed later by those due to cicatricial changes in the orifices. The disappearance of the murmur does not, therefore, justify a favorable prognosis. This can only be given when the murmur has not reappeared after an interval of one or two years.

Treatment. The author is one of those who believe that the salicylates do good in rheumatism. It seems reasonable that, if they help rheumatism, they will have a favorable influence upon the endocarditis, which is a manifestation of rheumatism. It is hard to understand, at any rate, how they can do any harm in rheumatism, as some writers claim they do. The most satisfactory preparation of salicylic acid for

children is aspirin. This boy should have five grains every three hours until the joint symptoms and fever are relieved, unless he gets toxic symptoms. If he does, the dose should be reduced. It should be continued in the same dose, three times a day, for several days or a week longer.

The most important thing in the treatment of acute endocarditis in childhood is rest. Everything else is subordinate. He must be kept in bed not only during the acute stage, but for months longer. Three months is the minimum. A week in bed at this time may mean a year of life later. In the beginning he must be kept flat or as nearly flat as is possible. Judgment must be used in this connection, however, because he may fret and fuss so much at being kept flat that he will bring more strain on his heart than if he is allowed to sit up. His life must be most carefully regulated for a year or two after he gets up, and the amount of exertion limited. He will feel perfectly well and will wish to do what other children do. He must, however, be restrained. His whole life must be planned so as to save the heart.

His compensation is perfectly good. There is, therefore, no call for either cardiac stimulants or tonics. If he is restless or uncomfortable, he may be given the bromide of sodium or potassium in five- or ten-grain doses, or morphia in doses of from one thirty-second to one sixteenth of a grain.

There are no special indications as to his diet. He must be given a milk and starchy diet at first. Later, there is no objection to meat and eggs. Special attention must be paid to his nutrition, as the condition of the heart muscle depends to a considerable extent on the general nutrition.

CASE 66. Levi P., fifteen years old, had had repeated attacks of rheumatic fever since he was four years old. He began to be short of breath on exertion when he was fourteen, but this was never severe enough to cause any inconvenience. He occasionally suffered from palpitation. He had another attack of rheumatic fever the latter part of May. Since then dyspnea and palpitation had been very troublesome and any exertion completely exhausted him. His appetite was good and his bowels moved regularly. He had no signs of indigestion. He had a slight cough, but no expectoration. The dyspnea and palpitation finally became so troublesome that he gave up and went to bed June 16. He was able to lie down, but was more comfortable sitting up. Rest in bed made him more comfortable until June 20, when he began to complain of pain and oppression in the chest. He became rapidly worse, so that on the 22d he was unable to lie down with comfort, was restless and had begun to vomit. The temperature, which had been running between normal and 101° F., gradually went up to 102° F., and the rate of the pulse and respiration rose from 100 and 25 to 140 and 40, respectively. He was seen in consultation June 22.

Physical Examination. He was well developed and nourished. He was restless and unable to lie down. His expression was anxious. He was everywhere slightly cyanotic. The cardiac impulse was not visible; it was palpable in the fourth space, midway between the sternum and the nipple (normal is fifth space, 1 cm. inside the nipple). The upper border of the relative cardiac dullness was at the upper border of the second rib (normal is middle of third rib); the left border 13 cm. (normal is 8 or 9 cm.) to the left of the median line; the right border 6 cm. (normal is 3 to 4 cm.) to the right of the median line in the fourth space, and 7 cm. to the right of the median line in the fifth space. The action was regular; the rate, 140. The heart sounds were markedly feeble. The first sound at the apex was preceded by a faint, rumbling sound and directly followed by a soft, blowing sound which was transmitted toward the axilla. The second pulmonic sound was somewhat louder than the second aortic. There was a soft, double, rubbing sound close to the ear and increased by

pressure of the stethoscope, synchronous with the heart beat, under the manubrium and in the second spaces. The pulse was fairly strong. There was an area of dullness, with bronchovesicular respiration and slightly increased voice sounds, at the base of the left lung, extending outward about 7 cm. from the median line and upward about 5 cm. There were numerous very fine, moist râles in both lower backs. The lungs were otherwise normal. The upper border of the liver flatness was at the upper border of the sixth rib in the nipple line; the lower border was not palpable. The spleen was not palpable. The abdomen was normal. The extremities showed nothing abnormal. There was no spasm or paralysis and no edema.

The urine was high, acid in reaction, of a specific gravity of 1,024 and contained neither albumin nor sugar. The sediment showed nothing abnormal.

Diagnosis. The trouble is, of course, entirely cardiac. The condition in the heart is, however, a fairly complicated one. The location of the impulse well inside the left border of the cardiac dullness, the combination of feeble heart sounds with a regular action, a reasonably strong pulse, and an accentuated second pulmonic sound, and the extension of the right border of dullness farther to the right in the fifth than in the fourth space (thus making the cardio-hepatic angle obtuse) prove that there is a PERICARDIAL EFFUSION. The peculiar characteristics of the double rubbing sound under the manubrium and in the second spaces show that there is also a DRY PERICARDITIS at the base. This is corroborative evidence of pericardial effusion. The presence of cyanosis and distress without edema and enlargement of the liver and spleen also counts in favor of a pericardial effusion and against a dilatation of the heart. The effusion developed immediately after an attack of rheumatism, and is, therefore, almost certainly serous. The absence of marked irregularity in the temperature and of chills and sweating is also in favor of a serous fluid.

The double murmur at the apex shows that there is a lesion at the MITRAL orifice, certainly INSUFFICIENCY, probably STENOSIS, perhaps only roughening of the orifice. The

effusion into the pericardium makes it impossible to determine the size of the heart. The accentuation of the second pulmonic sound shows, however, that there must be hypertrophy of the heart and that, if there are both dilatation and hypertrophy, the hypertrophy is in the ascendance. The history of repeated attacks of rheumatism and of dyspnea and palpitation before the present illness shows that the lesion is a chronic one. The accentuation of the second pulmonic sound is corroborative evidence. The strength of the pulse, the good second sound and the regularity of the heart show that the myocardium is but little, if at all, affected.

The area of dullness and bronchovesicular respiration in the lower left back is due to compression of the lung by the pericardial effusion. The râles show a small amount of edema of the lungs.

Prognosis. The prognosis in this instance, as always in pericarditis with effusion, especially if associated with chronic valvular lesions, is a very grave one. The most favorable point here is the absence of myocardial involvement. There is a reasonable chance, perhaps one in four, that he will survive the present acute condition. He will be left, however, not only with a chronic valvular lesion, but also with an adherent pericardium. He is also very liable to have more attacks of rheumatism and further involvement of the heart. If he survives the present attack, the chances are, therefore, that he will live but a few years.

Treatment. The first thing to be decided is whether it is advisable to tap the pericardium. The heart is standing up to the increased work very well, as is shown by the regularity of its action, the good pulse and the accentuation of the second pulmonic sound; there is almost no edema of the lungs and no signs of passive congestion elsewhere. If he can be kept under close observation, it will be wise to delay aspiration in the hope that the effusion will diminish rather than increase. If the heart weakens or signs of passive congestion appear, the pericardium must be tapped at once. Blisters and the application of other counterirritants to the precordia can do no good, will make him uncomfortable and increase the chances of septic infection. A light ice-bag, suspended over the pre-

cordia so as not to cause pressure, may make him more comfortable and in some instances seems to favor the absorption of the fluid. Tincture of digitalis, in doses of five drops every four hours, will help the heart to meet the increased work thrown on it by the pressure of the fluid in the pericardium. This dose may be doubled or trebled, if necessary. He may sit up or lie down, according to which is the more comfortable. Fresh air will make his breathing easier. Oxygen may be given, if necessary. There is no objection to morphine, in doses of from one sixteenth to one eighth of a grain, if he is very uncomfortable.

He must be fed often with small amounts of liquids and soft solids, since swallowing is often very painful and chewing tiresome.

CASE 67. Clarence G., eleven years old, was the child of healthy parents. There was nothing in the family history to suggest syphilis. There was no tuberculosis in the family and he had had no known exposure to it. He was born at full term after a normal labor and was normal at birth. He was breast-fed and was very well as a baby. He had measles and whooping-cough when five, diphtheria when six, scarlet fever when seven, and chicken-pox when nine years old. He had a short indefinite illness, associated with pains in the extremities, in January, 1907, which was called "grippe." His abdomen began to swell about the first of April, 1907. Some months later he began to be short of breath and to have a little swelling of the legs. The swelling of the abdomen and the dyspnea did not change much, but the swelling of the extremities often disappeared entirely for a time. His appetite and digestion continued good. Recently he had been unable to lie down with comfort, had had some cough and more swelling of the legs. He had had no fever. He was seen September 9, 1908.

Physical Examination. He was well developed and nourished and of good color, but unable to lie down without much discomfort. There was no edema of the face or chest, and no enlargement of the superficial veins of the chest. There was no tracheal tug and no diastolic collapse of the veins in the neck. The tongue was clean, the throat normal. There was no dullness under the manubrium. The cardiac impulse was not visible and was only feebly palpable in the region of the nipple. There was no systolic retraction either here or in the back. The upper border of the relative cardiac dullness was at the upper border of the third rib; the left, just outside the left nipple (normal is 1 cm. inside); the right, 5 cm. to the right of the median line (normal is 3 cm. to the right of the median line). The cardio-hepatic angle was acute. The action was regular. The first sound was a little short and sounded a little distant. The second pulmonic sound was not accentuated. There were no murmurs. There was dullness, changing to flatness toward the base, on the left side below the spine of the scapula behind, the fifth rib in the axilla and the third rib in front. The respiration and voice sounds in

this area were somewhat diminished in intensity, but not changed in character. The vocal fremitus was somewhat diminished. A few râles were heard. There was dullness over the whole right back with a few fine, moist râles at the base. The abdomen was much and symmetrically enlarged. There was no enlargement of the superficial veins. There was flatness in the flanks and hypogastrium, the upper border of the flatness being concave when he lay on his back. The area of flatness changed with change of position and there was a definite fluid wave. No masses were felt. The upper border of the liver flatness was at the upper border of the fifth rib in the nipple line (normal is at the upper border of the sixth rib); the lower border of the liver was palpable 11 cm. below the costal border in the nipple line (not normally palpable). The spleen was not palpable. There was some edema of the external genitals and legs. The pulse was stronger in the left than in the right wrist, and was of the paradoxical type. There was no enlargement of the peripheral lymph nodes.

The urine was normal in color, acid in reaction and of a specific gravity of 1,025. It showed a very slight trace of albumin, but did not contain sugar. The sediment showed an occasional hyaline and fine granular cast, a few free leucocytes and many squamous cells.

Blood.

Hemoglobin,	80%
Red corpuscles,	5,600,000
White corpuscles,	6,700
Mononuclears,	22%
Polynuclear neutrophiles,	76%
Eosinophiles,	1%
Myelocytes,	1%

There was no variation in the size or shape of the red cells and no stippling.

A skin tuberculin test was negative.

Diagnosis. The most reasonable explanation of this boy's condition is as follows: The illness which was called " grippe " was in all probability rheumatism. He developed a low-grade pericarditis and mediastinitis which resulted in the oblitera-

tion of the pericardial cavity and the formation of adhesions between the pericardium and the mediastinal tissues. The negative tuberculin test shows that this process was not tubercular, as it sometimes is. The points in favor of this assumption are the feeble cardiac impulse and the enlargement of the area of dullness in connection with normal heart sounds, the paradoxical pulse and the difference in the strength of the pulse in the two wrists. Many other signs, sometimes present in this condition, are, it is true, lacking, but these seem sufficient to justify the diagnosis.

The inflammatory process extended to the pleuræ and resulted in the formation of pleural adhesions and thickening, which account for the signs in the backs. The pleural adhesions interfere with expansion of the lungs, as does the pressure of the distended abdomen and of the enlarged liver, and cause a congestion at the bases, which accounts for the râles.

The chronic adhesive pericarditis produced a cirrhosis of the liver. This type of cirrhosis is a peculiar one and due only in part to passive congestion. It is not accompanied by the signs of congestion in other organs. The first symptom of this condition which is usually noticed is, as in this instance, enlargement of the abdomen as the result of ascites. The edema of the external genitals and legs is due to the pressure of the fluid in the abdomen on the inferior vena cava, not to passive congestion. The changes in the urine are presumably largely due to passive congestion of the kidneys from the pressure of the ascitic fluid on the renal veins and cava. The final diagnosis is, therefore, CHRONIC ADHESIVE PERICARDITIS, with sequelæ.

Prognosis. There is, of course, no cure for the lesions in the pericardium, mediastinum, pleuræ and liver. He will probably live, however, for a number of years.

Treatment. Tapping the abdomen from time to time will make him much more comfortable. Other treatment must be symptomatic.

SECTION VIII.

DISEASES OF THE LIVER.

CASE 68. Richard B. was weaned suddenly July 1, when about nine months old, because his mother was found to be pregnant. He was very large at birth and had gained weight very rapidly. He was not as active, either physically or mentally, as most babies of his age. He was given a very improper diet and after a few days began to vomit and have loose, undigested movements. A careful physical examination, made by a physician who saw him July 11, showed the edge of the liver 2 cm. below the costal border in the nipple line. He was then cleaned out thoroughly and given only water. He was kept on water some days, nutrient enemata being given in addition. These were, however, not well retained. After about ten days he was given cereal waters, which he did not like and of which he took very little. He continued to have from three to four loose, yellow movements daily and, in consequence, he was given no milk until August 1, when he was put on a mixture of one part of skimmed milk and three parts of arrowroot water. He took about twenty-four ounces of this mixture in twenty-four hours. His movements had become a little firmer since the milk was begun. He had been cleaned out thoroughly several times during the last three weeks and had had his bowels irrigated once or twice daily. He had been taking bismuth steadily, as well as three drops of whiskey every three hours. His temperature had varied from normal to 100° F. He lay quietly most of the time and seldom cried, although he occasionally whined. The physician had noticed a hard swelling in the abdomen about ten days before. It had steadily increased in size. He was seen in consultation August 4.

Physical Examination. He was still a good-sized baby, although he had evidently lost much weight. He was very

pale and paid very little attention to anything that was done to him. The anterior fontanelle was 3 cm. in diameter and somewhat depressed. The bones of the skull did not overlap. There was no rigidity of the neck. There was a venous hum in the neck. The pupils were equal and reacted to light. The tongue was slightly coated; the mouth and throat were normal. He had six teeth. The heart and lungs were normal. The upper border of the liver flatness in the nipple line was at the upper border of the fifth rib. The edge of the liver could be felt running across the abdomen just above the right anterior superior spine to the left costal border in the nipple line. The liver was hard, the surface smooth, the edge slightly rounded. It was slightly tender. The spleen was not palpable. The abdomen was otherwise normal. The extremities were normal except for slight edema of the feet. There was no spasm or paralysis. The knee-jerks were equal and feeble. Kernig's sign was absent. There was a fine purpuric eruption on the abdomen and on the feet. There was no enlargement of the peripheral lymph nodes. The rectal temperature was 98° F.

The urine was pale, acid in reaction, and of a specific gravity of 1,010. It contained neither albumin nor sugar.

Diagnosis. The most striking thing in the physical examination is the enlargement of the liver, which has developed in less than three weeks. This enlargement has come on too rapidly to be due to any form of cirrhosis; it cannot be due to passive congestion, because the heart and lungs are normal; there is no cause for amyloid change; the enlargement is too uniform for malignant disease. The only reasonable explanation for the enlargement is fatty change. The cause of this fatty change is not difficult to find. He has had practically no nourishment for more than three weeks, and must also have had a certain amount of toxic absorption from the intestines during this time. Disturbance of nutrition is one of the most common causes of fatty change in the liver, and intestinal toxemia in infancy almost always causes fatty degeneration of the liver. The pathological condition in the liver is undoubtedly a mixture of fatty infiltration and degeneration, the infiltration being the more important. The

hard, smooth surface and the slightly rounded edge are also characteristic of the fatty liver. The diagnosis of "FATTY LIVER" is, therefore, justified.

The pallor and the venous hum in the neck are signs of anemia, which is undoubtedly also due to the disturbance of the nutrition from the lack of food. The purpuric eruption is, likewise, merely a sign of disturbed nutrition.

Prognosis. The prognosis is a serious one. It is impossible to determine at once whether or not the disturbance of nutrition has progressed so far that recovery is impossible when proper food is given. Time alone can settle this point.

Treatment. The only food which is likely to be utilized in this instance is human milk. This should be obtained at any cost. If he will not nurse or take it well from the bottle, it must be given through a tube passed through the mouth. If human milk cannot be obtained, a modified milk, low in fat and high in sugar and proteids, will be the best substitute. A mixture containing 1.00% of fat, 7.00% of sugar and 2.00% of proteids is a suitable one. There are no drugs that will help him. It is important, of course, to handle him as little as possible, to keep him warm and to give him a large supply of sunlight and fresh air.

CASE 69. William H.'s father and mother were living and well, as were three other children, one older and two younger than the patient. There had been no deaths in the family, but his mother had miscarried after her first child was born. He had had no known exposure to tuberculosis. He was born at full term and had always been well except for an attack of bronchopneumonia when he was a month old, and measles and mumps when he was three years old. His digestion had always been good. No history of alcoholism could be obtained.

He had been running down since the early spring, but was still able to be up and about most of the time. He was often drowsy and frequently complained of headache. He had been more or less jaundiced since May. The skin was nearly clear at times, but the eyes were always yellow. His appetite was good and he did not vomit or complain of pain in the abdomen. The bowels moved daily; the movements were rather light in color, but never gray or white. The urine was often dark colored and had recently stained his clothing yellow. He was seen September 26, when six years old.

Physical Examination. He was well-developed and fairly nourished. The skin, conjunctivæ and mucous membranes were distinctly yellow. His tongue was clean; his teeth in fair condition. The throat was normal. The cardiac impulse was palpable in the fourth space in the nipple line, 6 cm. to the left of the median line. The upper border of the relative cardiac dullness was at the upper border of the third rib, the right border $2\frac{1}{2}$ cm. to the right of the median line. The action was regular. The first sound was of fair strength, but was followed at the apex and pulmonic area by very faint murmurs, which were not transmitted. The second pulmonic sound was not accentuated. There was a venous hum in the neck. The lungs were normal. The upper border of the liver flatness was in the fifth space; the lower border was palpable 4 cm. below the costal border in the nipple line. The edge was somewhat rounded, the surface smooth. The gall bladder was not palpable, no masses could be made out, and the liver was not tender. The spleen was not palpable and was not enlarged to percussion. The abdomen was moderately dis-

tended and the superficial veins in the upper portion enlarged. There was slight dullness in the flanks, but it did not change with change of position, and there was no fluid wave. The extremities were normal. There was no spasm or paralysis. The knee-jerks were equal and normal. There was no edema of the extremities. There was no enlargement of the peripheral lymph nodes. There was no eruption and no scars of old eruptions. There were no mucous patches or rhagades. The rectal temperature was normal.

The urine was dark in color, acid in reaction, of a specific gravity of 1,030, and contained the slightest possible trace of albumin and much bile, but no sugar. The sediment showed many small round cells, a few red blood corpuscles, leucocytes and squamous cells, and an occasional hyaline and fine granular cast.

The stools were loose, brownish and foul, and were shown by chemical examination to contain bile pigment.

The leucocyte count was 9,900.

A skin tuberculin test was negative.

Diagnosis. Syphilis of the liver can be ruled out on the good family history and the absence of all other signs of syphilis. Less important points against syphilis of the liver are the presence of jaundice and the absence of enlargement of the spleen. Tuberculosis of the liver can be excluded on the negative tuberculin test. The facts that there are two murmurs, that they are not transmitted, that the second pulmonic sound is not increased, that the heart is not enlarged and that there is a venous hum in the neck show that the murmurs in the heart are anemic. The heart being otherwise normal, cirrhosis of the liver secondary to chronic adhesive pericarditis can be eliminated. The presence of bile in the stools rules out duodenal indigestion and obstruction of the large bile ducts. Abscess of the liver can be excluded on the absence of fever and the low white count. The marked jaundice and the beginning ascites are also against it. The smooth surface of the liver and the presence of jaundice without obstruction of the large ducts makes a new growth extremely improbable. The diagnosis is, therefore, by exclusion, Cirrhosis of the Liver. The absence of enlargement of the

spleen, which is one of the earliest signs of hypertrophic cirrhosis, and without which this diagnosis is not justified, makes cirrhosis of the atrophic variety, in the pre-atrophic stage, the most probable diagnosis. There is nothing in the history to account for the development of the cirrhosis, since chronic alcoholism and disease of the gastro-enteric tract can be excluded.

Prognosis. There is no chance for recovery. He will probably not live many months.

Treatment. The treatment can be only symptomatic.

CASE 70. Richard D. was seen in consultation when six years old. His mother had had a cancer of the breast removed eight years before. She was well for six years, when she had a recurrence in the liver and glands, and died a year later. He had always been well before the present illness.

He had not been up to mark since an attack of chicken-pox several weeks before he was seen. There had, however, been no definite symptoms. Enlargement of the abdomen and of the superficial lymph nodes was first noticed a week before. The abdomen had increased in size very rapidly during the week. His appetite had fallen off, but there had been no nausea, vomiting or pain in the abdomen. The bowels had moved regularly; the movements were of good color and looked perfectly digested. He had lost weight, strength and color very rapidly during the week. The temperature had been moderately elevated during the early part of the week, but had been normal for three days.

Physical Examination. He was well developed and nourished, but had evidently lost considerable weight and color. There was no jaundice. The tongue was nearly clean; the throat normal. The heart and lungs were normal. The abdomen was much enlarged and there was distinct bulging in the epigastrium. The superficial abdominal veins were moderately enlarged. The upper border of the liver flatness in front was at the lower border of the fifth rib; behind, in the eighth space on the right and the ninth space on the left side. The lower border of the liver reached to the right anterior superior spine, ran across the abdomen midway between the pubes and the navel and thence nearly to the left anterior superior spine. The left border was concealed by the greatly enlarged spleen, which filled up the left flank and overlapped the liver. The surface of the liver was markedly irregular. Several masses, the size of hens' eggs, were easily felt, and there was one, the size of an orange, in the epigastrium. The liver was slightly tender. There were no evidences of fluid in the abdomen. The kidneys were not palpable. There was no edema of the extremities, which were normal. There was no spasm or paralysis. The knee-jerks were equal and normal. Kernig's sign was absent. There

were numerous lymph nodes, varying in size from that of a bean to that of a walnut, in the neck, a few small ones in the axillæ, and several, the size of marbles, in the groins.

The urine was normal in color, acid in reaction, of a specific gravity of 1,015 and contained neither albumin, sugar nor bile. The sediment showed nothing abnormal.

Stained specimens of the blood showed slight achromia, but no irregularity in the size or shape of the red corpuscles and no nucleated forms. There were no plasmodia and no leucocytosis. There were fifty-four polymorphonuclear neutrophiles to forty-six mononuclear cells.

Diagnosis. The diagnosis lies between malignant disease of the liver and acute lymphatic leukemia in an aleukemic stage. The points which suggest leukemia most strongly are the enlargement of the spleen and of the peripheral lymph nodes. It is true that in very rare instances there are times in the course of acute leukemia in which the number of white cells is not increased. In such instances, however, the proportion of mononuclear cells remains much higher than in this instance, in which the number of mononuclear cells is not much above the normal limit. Primary malignant disease of the liver is extremely rare, there being but thirty-nine cases on record. The trouble in the liver in this instance is, therefore, almost certainly secondary. The usual location of the primary lesion is in the suprarenal capsule. The enlargement of the spleen and lymph nodes is, therefore, like that of the liver, probably due to metastatic malignant involvement rather than to leukemia. The diagnosis of secondary MALIGNANT DISEASE OF THE LIVER is, therefore, justified. Sarcoma of the suprarenal capsule is much more common than carcinoma. The chances are, therefore, that the disease of the liver in this instance is sarcoma. The fact that his mother had a carcinoma is in all probability merely a coincidence.

Prognosis. The prognosis is, humanly speaking, absolutely hopeless. He will probably not live but a few weeks.

Treatment. It will be well to try the mixed toxins of the streptococcus of erysipelas and the bacillus prodigiosus, recommended by Coley. Little or nothing can be hoped from them, however, in this instance.

SECTION IX.

DISEASES OF THE KIDNEYS AND BLADDER.

CASE 71. Walter B., fourteen years old, had had measles, whooping cough, chicken-pox, influenza and tonsillitis, but not scarlet fever, diphtheria or rheumatism. His urine had been examined from time to time in the past, but had never contained albumin. He had an acute attack of appendicitis the latter part of December, 1909, which required operation and drainage. He had been below par for some time before this operation and had not been well since then, although he had had no very definite symptoms. He was easily tired, did not feel able to go to school and did not care to play. His appetite and digestion were good. He had no cough or fever. His chief complaint was of pain in the left iliac fossa, which was not dependent on either food or exertion. Micturition was at times a little painful, but was not increased in frequency. He thought that he did not pass any more urine than normal, and did not have to get up at night. He had always been thin and had lost some weight since the operation. He was seen at 2 P.M., May 27, 1910.

Physical Examination. He was thin and rather flabby, but not pale. He looked pulled down and was very nervous. His tongue was clean. His heart was normal except that at times the rhythm was a little irregular. The lungs were normal. The liver and spleen were not palpable. The abdomen was sunken and showed nothing whatever abnormal except the scar of the operation. The kidneys were not palpable. The genitals were normal. The extremities were normal. There was no spasm or paralysis; the knee-jerks were equal and normal. There was no edema and no enlargement of the peripheral lymph nodes.

The freshly passed urine was normal in color, clear, alkaline in reaction, of a specific gravity of 1,025, and showed a trace of albumin with nitric acid. The centrifugalized sedi-

ment showed a few small, round cells and no bacteria. The gravity sediment showed neither cells, casts nor blood.

Diagnosis. It is evident, in the first place, that the pain in the abdomen has no connection with the albumin in the urine. It is almost certainly due to adhesions formed at the time of the appendicitis. A bacterial infection of the urinary tract can be excluded on the absence of bacteria and pus corpuscles in the urine. The other possibilities are chronic nephritis and orthostatic albuminuria. His age and the fact that he does not get up at night to pass water are much against chronic interstitial nephritis. He has not had scarlet fever or diphtheria, the usual precursors of chronic parenchymatous nephritis at this age, and has never at any time had any symptoms of acute nephritis. The absence of all organic elements in the sediment, moreover, while possible in chronic interstitial nephritis, is very unusual; it practically excludes chronic parenchymatous nephritis. The high specific gravity is against chronic interstitial nephritis; the small amount of urine against chronic parenchymatous nephritis. The normal condition of the urine at various examinations in the past is also very much against the existence of any form of chronic nephritis. His age and slight build are in favor of orthostatic albuminuria. So also is the impaired muscular tone resulting from his enfeebled condition after the operation, which predisposes him to lordosis, the probable cause of orthostatic albuminuria. Although the diagnosis of orthostatic albuminuria seems reasonably certain, it will be wise to examine the urine further in order to settle the diagnosis. The albumin in orthostatic albuminuria is present only in the urine excreted when the patient is in the upright position. It is usually constantly present in interstitial nephritis or, if not, there is no regularity about its appearance. More urine is passed during the day than during the night in orthostatic albuminuria, while the reverse is the case in chronic interstitial nephritis. The total amount of the urine is unchanged in orthostatic albuminuria, while it is increased in interstitial nephritis.

The twenty-four-hour amount of urine was thirty-one ounces. Twelve ounces were passed during the night and

nineteen ounces during the day. The urine passed on getting up in the morning was pale, clear, acid in reaction, of a specific gravity of 1,030, and showed no albumin by either the heat or nitric acid tests. That passed during the morning was pale, clear, acid in reaction, of a specific gravity of 1,032 and showed a trace of albumin by the nitric acid test. That passed during the afternoon was pale, clear, acid in reaction, of a specific gravity of 1,030, and showed a slight trace of albumin by the nitric acid test. No cells or casts were found in the gravity sediment of any of the specimens. The diagnosis of ORTHOSTATIC ALBUMINURIA is thus confirmed.

Prognosis. The prognosis of this condition is good. It probably never leads to chronic nephritis. The duration is indefinite. It will probably persist in this instance until he gets back into good physical condition and grows heavier and more muscular.

Treatment. There is no specific treatment. The treatment consists in regulation of his life with the object of getting him into good general condition as soon as possible. It is not necessary to diminish the proteids in his diet. It will, however, be advisable for him to lie down for a time daily.

CASE 72. Harry D., eleven years old, had had frequent attacks of recurrent vomiting since he was a baby. He had had an attack of infantile paralysis, involving both legs and one arm, two months before. Nausea and vomiting began November 21 and continued in spite of several doses of calomel, which resulted in a number of large, well-digested movements. He had taken and retained very little nourishment, and had, in consequence, lost considerable weight and strength. He had had no fever. The urine passed during the day of the 26th was clear but small in amount. That night he had considerable pain in the abdomen, especially on the left side. It was not very severe and not paroxysmal. It did not run down into the penis, and micturition was not frequent or painful. The urine passed during the night was not diminished in amount but was distinctly bloody. He was rather lame the morning of the 27th, but had no pain. The urine continued to be bloody. His bowels moved well, but he continued to vomit. His mouth temperature rose to 101° F. He was seen in consultation at noon, November 27.

Physical Examination. He was fairly developed and nourished and a little pale. His tongue was dry and covered with a thin, brown coat. The cardiac area was normal, the sounds fairly strong, the action regular, the rate 120. The lungs were normal. The liver and spleen were not palpable or enlarged to percussion. The abdomen was much sunken. There was slight tenderness on deep pressure in the left flank, but no muscular spasm, dullness or tumor. The kidneys were not palpable and there was no tenderness over the ureters. The genitals were normal. The extremities were not examined.

The urine was red, strongly acid in reaction, of a specific gravity of 1,020 and contained a trace of albumin, considerable acetone and a little diacetic acid, but no sugar. The sediment was very abundant and was almost entirely composed of acid sodium urate crystals. It also contained a moderate number of normal red blood corpuscles and an occasional leucocyte, but no other cells or casts.

Diagnosis. He undoubtedly has one of his ordinary attacks of recurrent vomiting. The disturbance of metabolism at the bottom of the attack, the insufficient supply of food, or both

together, explain the presence of acetone and diacetic acid in the urine. The pain in the abdomen and the hematuria require further explanation. The condition is an acute one, and the examination of the kidneys shows nothing abnormal. It is unnecessary, therefore, to consider such conditions as sarcoma or tuberculosis of the kidney. Acute nephritis is seldom accompanied by pain. It can be excluded on the absence of cells and casts. The most probable explanation would, at first thought, seem to be a renal calculus. The pain was, however, not localized or paroxysmal and did not run down into the penis. Micturition was not painful or increased in frequency. These facts do not, of course, rule out a renal calculus, but make it less probable than at first appeared. A large number of sharp crystals in the urine might easily irritate the kidney sufficiently to cause the sort of pain present in this instance and hematuria. It is hard to conceive of anything sharper than the crystals of acid sodium urate which were so numerous in this boy's urine. Irritation of the kidneys and urinary tract from crystals of acid sodium urate is, therefore, the most reasonable explanation of the HEMATURIA. The disturbance of metabolism at the root of the recurrent vomiting, together with that due to an insufficient supply of food, and the concentration of the urine resulting from an insufficient supply of water, account satisfactorily for the formation of the acid sodium urate crystals.

Prognosis. The prognosis is good. The attack of recurrent vomiting will yield quickly to treatment. The hematuria will cease with relief of the attack of vomiting, and probably sooner if more water can be introduced into the system.

Treatment. See Case 12 for the treatment of recurrent vomiting. The indications for the treatment of the hematuria are to increase the amount of the urine and diminish its acidity. These can best be met by high injections of from eight to twelve ounces of a solution of one teaspoonful of bicarbonate of soda in eight ounces of water every four hours. The same solution may be given by mouth, in teaspoonful or tablespoonful doses, every fifteen or twenty minutes. Fortunately, this method of treatment is also the one most useful in recurrent vomiting.

CASE 73. Frances S., two and one-half years old, was the child of healthy parents. Three other children were living and well; none had died, but there had been two miscarriages. There was no history of tuberculosis in the family and there had been no known exposure to it.

She had always been well and strong. She had a cough for a few days about the 10th of August. Her parents noticed at this time that her eyelids were a little swollen in the morning. Not much was thought of it, however, as the swelling was gone by noon. It became more marked about a week later and had persisted. Swelling of the legs and abdomen also appeared in a few days and had steadily increased. It was noticed at this time that she was not passing as much urine as usual. She was put on an exclusively milk diet, which she took well. Her bowels had been kept well open by cathartics. She was admitted to the Children's Hospital, September 7.

Physical Examination. She was markedly pale, but did not appear very sick. There was marked general anasarca. Her eyelids were so much swollen that it was difficult to see her eyeballs. The pupils were equal and reacted to light. Her tongue was considerably coated. Her teeth were in bad condition and there was a slight pyorrhea alveolaris. The tonsils were ragged and injected. There was a venous hum in the neck. The cardiac impulse was neither visible nor palpable, probably because of the anasarca. The upper border of the relative cardiac dullness was in the second space, the right border $2\frac{1}{2}$ cm. to the right, and the left border 5 cm. to the left of the median line. The first sound was of good strength and was followed at the mitral area by a soft murmur, which was not transmitted. The second pulmonic sound was not accentuated. There was slight dullness, with diminished vesicular respiration and numerous fine, moist râles, below the sixth rib and extending outward to the mid-axillary line on both sides. The upper border of the liver flatness was in the fifth space in the nipple line; the edge was not palpable. The spleen was not palpable. The abdomen was much and symmetrically distended. The superficial veins were not enlarged. The percussion note was flat over the whole ab-

domen except in the epigastrium, where it was tympanitic. The upper border of the flat area was concave. The area of flatness changed with change of position, and there was a fluid wave. There was no spasm or paralysis of the extremities. The knee-jerks were equal and normal. There was no enlargement of the peripheral lymph nodes. There was no eruption or desquamation. The rectal temperature was 100° F., the pulse 110, the respiration 30.

Four ounces of urine were passed in the first twenty-four hours of her stay in the hospital. It was brownish in color, turbid, acid, of a specific gravity of 1,030 and contained twenty grams of albumin per liter, but no sugar or acetone. The sediment showed large numbers of hyaline, fine and coarse granular casts, and a few blood casts, as well as large numbers of red and white blood cells.

Diagnosis. She undoubtedly has ACUTE NEPHRITIS. The normal size of the heart and the absence of accentuation of the second aortic sound prove that there is no chronic trouble back of it. The etiology is obscure. The ragged, injected tonsils or the diseased teeth and gums may have been the portal of entry for the infection. The venous hum in the neck and the murmur in the heart are anemic in origin and unimportant.

Prognosis. The prognosis is grave. She is passing but little urine and has general anasarca, ascites and edema of the lungs. A more definite prognosis can be given in a few days after it has been seen how well she responds to treatment. If she responds quickly, she will probably recover entirely in time. If she does not respond, she will probably not live many days.

Treatment. Her kidneys are congested and engorged with blood, the glomeruli and tubules are blocked and the epithelium degenerated. They are able to excrete but little and are practically impervious to water. If they were not, she would not be edematous. Water must, therefore, be stopped entirely for the present. It ought not to be given again until the kidneys have begun to excrete fairly freely and the edema and ascites are diminishing.

Her kidneys should be spared the work of excretion as

much as possible. The products of the metabolism of certain foods are excreted with difficulty, and those of others easily. Those substances which are excreted with the most difficulty are urea, creatinin and phosphoric acid. Urea is derived from proteids: meat, eggs and milk. It would seem wise, then, to cut out all proteids from her diet. Nothing is gained, however, by reducing them below a certain point, because, even in starvation, a certain amount of urea is formed as the result of the destruction of the body tissues. If enough proteid is given to cover this nitrogenous waste, the body tissues are saved and the kidneys are not worked any harder than when no proteid is given. The amount of proteid required to balance the necessary nitrogenous metabolism of the body is known as the minimum proteid need, and is, in a child of this age, about twenty grams. Creatinin is derived from creatin. This is contained in meat and especially in meat extracts and meat broths. Meat extracts and broths contain little else and have but little nutritive value. They should, therefore, be entirely excluded from her diet. Milk contains but little creatinin. Phosphoric acid is present in large amounts in meats, yolk of egg, milk and many vegetables. The addition of calcium carbonate to the food, however, prevents its passage through the kidneys and causes it to be excreted by the intestines. The products of the metabolism of fat, sugars and starches are excreted by the kidneys without much difficulty.

It is not only necessary, however, to cover her proteid need, but also to cover her caloric needs. These are a little under 1,000 calories. She can get along very well for a time, however, on 800 or 900 calories.

The problem is, then, to lay out a diet for her which will contain 800 or 900 calories and about 20 grams of proteid. The best form in which to give the proteid is milk. Six hundred cubic centimeters of milk will give 21 grams of proteid, but only about 400 calories. If milk enough is given to furnish 900 calories it will contain 47 grams of proteid, which is more than double the minimum proteid need. The disadvantages of an exclusively milk diet are thus evident. If 200 ccm. of gravity cream (16% fat) is substituted for 200

ccm. of milk, the mixture will provide 600 calories. The remainder of the caloric need can be met by giving sugar and starch. For example, as is shown in the following table of food values, two tablespoonfuls of cereal will give 50 calories, two teaspoonfuls of sugar 50 calories, one slice of bread 75 calories, and a piece of butter one inch square and one-half inch thick, about 65 calories, making a total of 840 calories, which covers fairly satisfactorily her caloric needs, and does not add much to the proteids.

TABLE OF FOOD VALUES.

	Calories.	Grams. F.	C.	P.
Whole milk, 1 quart,	670	38	43	34
Skim milk, 1 quart,	400	10	43	35
Gravity cream, 1 pint,	860	77	22	14
Buttermilk, 1 quart,	360	5	43	35
Whey, 1 quart,	260	5	43	9
Beef juice, 1 ounce,	10			2
Crackers, 1 ounce,[1]	120	3	20	3
Bread, 1 slice,[3]	75	0.5	15	3
Zwiebach, 1 slice,[4]	120	3	20	3
Shredded wheat biscuit,	105	0.5	22	3
Oatmeal and other cereals (cooked), 1 tablespoonful,	25		5.5	1
Rice (cooked), 1 tablespoonful,	45		10	1
Potato, size of large egg,	100		20	2
Macaroni (cooked), 1 tablespoonful,	30	0.5	5	1
Egg { Whole,	72	5		7
Egg { Yolk,	60	5		4
Egg { White,	12			3
Meat / Fish (cooked), 1 ounce,[2]	60	3		7
Butter, 1¼ inches cube = 1 ounce,	225	24		
Olive oil, 1 tablespoonful,	125	14		
Sugar { Cane, 1 rounded teaspoonful,	25		6	
Sugar { Milk, 1 rounded tablespoonful,	60		15	
Green peas (cooked), 1 tablespoonful,	40		7	3
Carrots / Squash / Turnip (cooked), 1 tablespoonful,	30		6	1
Orange, medium sized,	50		13	
Apple, medium sized,	70		17	

[1] Crackers vary so much in size that they must be weighed to determine how many it takes to weigh an ounce.
[2] The lean of a lamb chop weighs about an ounce; so does a piece of meat about 1¼ inches cube.
[3] Bread, one slice = four inches square and three-eighths inch thick = 1 ounce.
[4] Zwiebach, one slice = large slice.
Clear soups and broths made without rice or barley have practically no nutritive value.
The nutritive value of the "fodder" vegetables, such as spinach, string beans, asparagus, lettuce, tomatoes and cucumbers, is so slight that it may be disregarded.

The addition of 30 grains of prepared chalk to the milk and cream mixture will probably render the phosphoric acid practically inert. The chief objection to the milk in this instance

is the water which it contains, a little more than a pint. In her present condition even this amount of water may do harm. It will be wise, therefore, to disregard her proteid needs for twenty-four or forty-eight hours and give her nothing but carbohydrates and fat. In fact, it will do her no harm if she takes no nourishment at all for twenty-four or forty-eight hours.

There are no drugs which can directly aid her kidneys to do their work. Digitalis and drugs of its class have no direct action on the kidneys, but increase the flow of urine by strengthening the action of the heart and thus sending more blood through the kidneys. Her kidneys are already engorged with blood. It is, therefore, not only irrational to increase the flow of blood to her kidneys, but also very likely to increase the trouble. Caffein, theobromin and their preparations have a direct stimulant action on the renal epithelium. Her renal epithelium is in no condition to respond to stimulation and, moreover, stimulation may do harm by increasing the inflammation. The action of alkalies is probably the same as that of other diffusible bodies which are excreted by the kidneys and which during their excretion increase the flow of urine. As the object of the treatment is to spare the kidneys, it hardly seems rational to give alkalies at this time to increase the work which they have to do. All drug treatment is, therefore, contra-indicated.

It is possible, however, to spare the kidneys by making the bowels do part of their work. She must, therefore, be made to have three or four large, watery movements of the bowels daily. Compound jalap powder, in doses of fifteen grains, or compound licorice powder, in doses of from one to two teaspoonfuls, will probably do this best in this instance, as she will probably not object to them as she would to concentrated solutions of Epsom salts, the ideal cathartic in this condition. The free catharsis will also help to diminish the edema.

It is important to get rid of the edema. The best way to accomplish this is by free diaphoresis. This spares the kidneys by getting the water out of the system, but does not save them in other ways, because it is certain that but little urea is eliminated in this way, and there is no proof that toxic

substances are excreted by the skin. Pilocarpin is the only diaphoretic drug powerful enough to be of any practical utility. It is, however, a very dangerous drug on account of its liability to cause edema of the lungs, and should never be used except in an emergency. Her condition is not serious enough to justify its use. The application of heat externally is far safer and usually more effectual. It is very difficult to keep a child in a hot-air bath long enough to get good results, as they soon become restless and kick the coverings loose. They object much less to hot packs. She should be wrapped in a blanket and put in a tub of water between 105° F. and 110° F. and kept there from ten to fifteen minutes. She should then be taken out, wrapped in a hot, dry blanket and kept surrounded by heaters for from one-half to two hours. This should be repeated daily as long as there is much edema.

CASE 74. Nora C., aged thirteen months, lived in a town in which malaria was common. She was breast-fed for five months. She was then weaned gradually and put on a "hit-or-miss" mixture of top milk with Mellin's Food, on which she did very well. Early in August, about three weeks before she was seen, she began to be feverish and was given calomel. The next day she was better, but two days later she had a chill. She had had no chills since then, but had sweat profusely at times and had lost much weight. Her temperature had not been normal but once in the last two weeks, and had been very irregular. The food had been changed to a weak top milk and barley water mixture. She had not vomited, but had been constipated. The movements, however, were normal in character. The Widal reaction, tested three days before, was negative. The diagnosis of malaria having been made, on the basis of the irregular temperature, the chill, the sweating and the negative Widal test, she had been given quinine in considerable doses during the last six days without, however, any improvement in the symptoms.

Physical Examination. She was well developed and nourished, but a little pale and flabby. The anterior fontanelle was 3 cm. in diameter and level. She was irritable, but not stupid. Her mouth and throat showed nothing abnormal. She had eight teeth. There was no rosary. The heart, lungs and abdomen showed nothing abnormal. The liver was palpable 2 cm. below the costal border in the nipple line. The spleen was not palpable. The extremities were normal. There was no spasm or paralysis. The knee-jerks were equal and normal. There was no enlargement of the peripheral lymph nodes.

The blood showed 80% of hemoglobin, and 37,600 white corpuscles.

Diagnosis. The negative Widal test and the leucocytosis rule out typhoid fever. The absence of enlargement of the spleen and the leucocytosis, as well as the failure of the quinine to influence the symptoms, exclude malaria. The fever, chills, sweating and leucocytosis point to a purulent process somewhere. There is nothing about the symptomatology to suggest the location of this process. In such instances the middle

ear and the urine must always be investigated, since in infancy both otitis media and pyelitis often cause marked general, without any local, symptoms. If the trouble is not found in one, it is almost certain to be found in the other. If both are normal, the trouble is most often tubercular.

The ears were examined and found normal.

The fresh urine was cloudy, pale, neutral in reaction and contained a very slight trace of albumin. The sediment obtained by centrifugalization showed very many pus cells, free and in clumps, a few small round, squamous, oval and caudate cells, and many motile bacteria. These bacteria were later shown to be colon bacilli.

The diagnosis is, therefore, PYELITIS, or, better, infection of the urinary tract by the bacillus coli.

Prognosis. There is practically no danger as to life. She will probably recover in a few weeks, but there is a reasonable probability that the condition will persist, with intermissions, for many months. In some instances the urine continues to contain bacteria, and at times pus, for years, although there is no constitutional disturbance. There is very little danger that the process will extend to the kidney tissue or that it will involve anything more than the superficial layers of the pelvis and bladder.

Treatment. Local treatment of the bladder is of comparatively little value because the infection is not localized in the bladder but involves the whole urinary tract. It is better, therefore, not to use it in this instance. Hexamethylenamin, the best drug of its class, liberates formaldehyde readily in the urine and has a strong antiseptic action. Unfortunately the colon bacillus is comparatively insusceptible to its action. Hexamethylenamin is usually less effective than the alkalies, which, in spite of the fact that the colon bacillus grows more luxuriantly in alkaline than in acid media, are often very useful. It will be well, therefore, to give her ten grains of the citrate of potash, well diluted, three times a day. If this dose is not sufficient to make the urine highly alkaline, larger doses must be given. If the urine does not clear up under this treatment, hexamethylenamin, in doses of from one-half grain to one grain, three times a day, should be tried. If the trouble

still persists, it will be well to try the effect of suddenly changing the reaction of the urine every three of four days, which sometimes clears up the urine very quickly. It can be made alkaline with the citrate of potash and acid with benzoic acid, in doses of from one to three grains, three times a day.

If the trouble still continues, the vaccine treatment may be tried, but too much must not be hoped from it. In some instances it works very well; in others it has no effect whatever. An autogenous vaccine must be used. It will be well to begin with 25,000,000 every three or four days, increasing the dose rather rapidly to 100,000,000. The treatment can be carried on satisfactorily without determinations of the opsonic index.

CASE 75. Mary W., aged seven months, was taken suddenly sick with high fever the night of July 7. No cause for the fever could be made out. The temperature ran between 103° F. and 105° F. up to the time she was seen in consultation, July 14. The physical examination had always been negative. She had had a slight cough in the beginning. She had taken her food poorly, but had vomited but once. The bowels had moved regularly and the movements had been normal. She had always been conscious, but during the last two days had seemed tender all over and had held her head backward. During the last two or three days micturition had been painful but not increased in frequency, and the urine had left greenish-yellow spots on the diapers.

Physical Examination. She was well developed and nourished, but had evidently lost some weight and color. She was conscious, but irritable. The anterior fontanelle was 3 cm. in diameter and depressed. There was no rigidity or tenderness of the neck and no neck sign. The pupils were equal and reacted to light. The ear-drums were normal. The tongue was dry, the throat and gums normal. There were four teeth. The heart, lungs and abdomen were normal. The liver was just palpable in the nipple line. The spleen and kidneys were not palpable. The extremities were normal. There was no spasm or paralysis. The knee-jerks were equal and normal. Kernig's sign was absent and there was no contralateral reflex. There was no enlargement of the peripheral lymph nodes. The rectal temperature was 103.6° F., the pulse 160, the respiration 40.

A stool which was seen was loose, smooth, yellow and contained no curds or mucus. There were several small spots, looking like pus, on the diaper.

Diagnosis. The most probable diseases in this instance are pneumonia, cerebrospinal meningitis and pyelitis. The sudden onset, the continued high fever and the slight cough suggest pneumonia, but the absence of physical signs after a week and the fact that the rate of the respiration is not increased out of proportion to that of the pulse make it extremely improbable. Meningitis is suggested by the history of general tenderness and of the tendency to hold the head

backward. It can be ruled out at once, however, on the depressed fontanelle and the absence of all signs of meningeal irritation or increased cerebral pressure. A lumbar puncture was done, however, at the request of the attending physician. The fluid ran out slowly, drop by drop, was perfectly clear, did not form a fibrin clot and contained no cells or bacteria (for description of the cerebrospinal fluid in health and disease see Case 38), thus proving that the trouble was not meningitis.

The continued high fever without physical signs and with normal ears suggests at once the possibility of pyelitis. The painful micturition and the greenish-yellow spots on the diapers make this diagnosis almost certain. The urine was, therefore, obtained with a catheter. It was pale, turbid, acid in reaction and contained many pus cells and motile bacteria, which were later proved to be colon bacilli. The results of this examination confirm, of course, the diagnosis of PYELITIS.

Prognosis. See Case 74.

Treatment. See Case 74.

CASE 76. Catherine R. was the fourth child of healthy parents. There had been no deaths or miscarriages. She had not, as far as known, been exposed to tuberculosis.

She was born at full term after a normal labor and was normal at birth. She was breast-fed, but was given in addition bread, potatoes and, in fact, a taste of almost everything on the table. Her digestion was good in spite of her faulty diet, and she gained steadily in weight up to an attack of bronchitis, when she was nine months old. She did not seem as well after the bronchitis and ceased to gain, although her appetite and digestion continued good. Enlargement of the abdomen was noticed when she was nine and a half months old, and had increased rapidly since then. The abdomen had not been tender and the urine had never been red. She was seen in consultation when ten months old.

Physical Examination. She was fairly developed and nourished. Her skin was pale, but her lips were red. The anterior fontanelle was 2 cm. in diameter and level. She had four teeth. Her tongue was clean and her throat normal. There was no rosary. Her heart and lungs were normal. The liver was palpable 3 cm. below the costal border in the nipple line. The spleen was not palpable. The left half of the abdomen was nearly filled by a hard, smooth, rounded mass. It had no definite borders, was flat on percussion and not at all tender. It filled the flank and evidently originated deep in the abdomen. It was not movable and its position was not influenced by the respiration. The abdomen showed nothing else abnormal. The extremities were normal and there was no edema. There was no spasm or paralysis; the knee-jerks were equal and normal; Kernig's sign was absent. There was no enlargement of the peripheral lymph nodes. The mass could be felt on rectal examination.

Stained smears of the blood showed no changes in the red corpuscles and no leucocytosis. A large majority of the white corpuscles were lymphocytes, although there was a slight excess of eosinophiles.

Diagnosis. The location of the mass deep down in the flank and its rounded character, without definite borders, prove that it is not a tumor of the spleen. The tumors in

caseous or fibrocaseous tubercular peritonitis are not as large, are irregular in outline and usually multiple. Enlargement of the retroperitoneal lymph nodes might cause a tumor in this region, but it would not be as large and would be irregular in outline. The only organ whose enlargement would cause a tumor in this location is the left kidney. This tumor must, therefore, be the left kidney. The possible causes of enlargement of the kidney are hydronephrosis, pyonephrosis and sarcoma. Hydronephrosis is extremely rare at this age, she has had no attacks of pain and there is no fluctuation. Pyonephrosis is also extremely uncommon at this age, there is nothing in her history to suggest an infection of the urinary tract, she has no fever or leucocytosis, her general condition is good and there is no fluctuation. Sarcoma of the kidney is more common at this age than at any other, it develops insidiously without much disturbance of the nutrition, and the tumor in this instance corresponds in its physical characteristics to those of sarcoma of the kidney. The eosinophilia is also suggestive of a new growth. The absence of hematuria does not count against sarcoma, because it occurs in but a small proportion of the cases. The diagnosis of SARCOMA OF THE KIDNEY is, therefore, justified.

Prognosis. The prognosis without operation is absolutely hopeless. She will probably not live more than three or four months. It is not much better with operation. The operation is a serious one and often fatal. Recurrence takes place in the neighboring tissues in the large majority of those that survive the operation. A few recover.

Treatment. The only treatment is the immediate removal of the tumor.

SECTION X.

DISEASES OF THE BLOOD.

CASE 77. Mary J. was seen when twenty-three months old. Her mother had died soon after her birth of a cancer which she had had during the pregnancy. She had always been fed exclusively on modified milk. She had had no illnesses except several slight digestive upsets when about a year old. She took her food well and did not vomit, although at times she seemed nauseated. Her bowels moved regularly and the movements were normal. She was listless and quiet and her temperature was usually a little subnormal.

Physical Examination. She was well developed and nourished, but moderately pale. The anterior fontanelle was closed and her head was of good shape. She had twelve teeth. Her tongue was clean and her mouth and throat normal. There was a venous hum in the neck. The heart was normal except for a systolic murmur at the pulmonic area, which was not transmitted. The lungs were normal. There was a slight rosary. The level of the abdomen was that of the thorax. The liver was palpable 1 cm. below the costal border in the nipple line. The spleen was not palpable. The extremities were normal. There was no spasm or paralysis. The knee-jerks were equal and normal. There was no enlargement of the peripheral lymph nodes.

The urine was pale, clear, faintly acid in reaction, of a specific gravity of 1,012, and contained neither albumin nor sugar. The sediment showed nothing abnormal.

BLOOD.

Hemoglobin,	50%	(normal = 70%)
Red corpuscles,	5,122,000	(normal = 5,500,000 to 6,000,000)
White corpuscles,	11,300	(normal = 10,000 to 12,000)
Mononuclears,	31%	(normal)
Polynuclear neutrophiles,	65%	
Eosinophiles,	1%	
Mast cells,	3%	

The red corpuscles showed some variation in size and shape and some achromia, but no nucleated forms.

Diagnosis. The venous hum in the neck and the systolic murmur at the pulmonic area are, of course, merely signs of the very evident anemia. The percentage of hemoglobin is about seventy per cent of the normal, while the number of red corpuscles is about ninety per cent of the normal. The morphological changes in the red corpuscles are so slight that they are of but little importance. The blood picture is, therefore, that of chlorosis. The diagnosis of chlorosis is for many reasons, however, not justified in this instance, in spite of the characteristic blood picture.

In the first place, the percentage of hemoglobin is always relatively low in infancy. This is presumably due to the fact that the infant normally receives an insufficient supply of iron in its food and that the reserve of iron present in the liver at birth is not large enough to keep the percentage of hemoglobin at the adult standard. The reserve of iron is, moreover, often insufficient, and in any event is comparatively easily exhausted. It is seldom sufficient to outlast the first year. This relative disproportion between the hemoglobin and the number of red corpuscles, when compared with the adult standard, is almost always exaggerated in the blood diseases of infancy.

This infant was, on account of her mother's illness during the pregnancy, probably born with an insufficient reserve of iron. She has never had any food but milk, which does not contain enough iron to meet the needs of the normal infant's system. Her reserve, being insufficient, was undoubtedly exhausted long before the end of the first year, so that for a year or more she has been unable to make up for the lack of iron in her food and has been falling more and more behind. That is, the causes which make the hemoglobin low under normal conditions in infancy are much exaggerated in her case. The diagnosis of chlorosis is, therefore, not justified in this instance. The real condition is a SECONDARY ANEMIA, due to the long-continued exclusive milk diet.

Further evidence against the diagnosis of chlorosis in these cases is that they occur indifferently in boys and girls, and

that they have no pathologic connection with the nervous or genital systems.

Prognosis. The addition of other foods to her diet and the administration of iron will improve the condition of the blood very rapidly.

Treatment. Beef juice and egg should be at once added to her diet because of the iron which they contain. Starchy foods should also be added. She is old enough to digest them and needs a more varied diet in order to thrive. The best forms of iron for her are the saccharated carbonate and ferratin. The former may be given in five-grain and the latter in three-grain doses, three times daily, after food.

CASE 78. Alma H., seven months old, was the second child of healthy parents. There was no tuberculosis in the family and there had been no known exposure to tuberculosis. She was born at full term after a normal labor, was normal at birth and weighed ten pounds. She had had nothing but the breast and had always done well. The outside of the house had been painted just before the onset of her illness. Her mother also menstruated for the first time just at the time of the onset. Her parents affirmed that she was perfectly well and had a good color on April 2. Marked pallor was noted the next day. She had had no hemorrhages or other symptoms of illness. The pallor became yellowish on April 6 and the mucous membranes pale on April 7. There had been no increase in the pallor up to April 11, when she was seen. The conjunctivæ had not been yellow, the movements had been dark green in color and the urine had not contained bile. She had had no hemorrhages and had not been tender. She had taken her food well and had not vomited. She had had no fever, but at times had seemed chilly and had had cold and blue extremities, but no sweating. She had become very quiet, but was not fussy.

Physical Examination. She was decidedly apathetic. She was well developed and nourished, but very pale. The skin had a decided yellowish tinge, but the conjunctivæ were clear. The anterior fontanelle was 2 cm. in diameter and level. There was no rigidity of the neck and the head was of good shape. The tongue was clean; the mouth, gums and throat normal. There were no teeth. There was a slight venous hum in the neck. There was no rosary. The heart was normal except for a slight systolic murmur at the pulmonic area, which was not transmitted. The lungs and abdomen were normal. The liver was palpable 3 cm. below the costal border in the nipple line. The spleen was not palpable. There was no tenderness or swelling of the extremities except a little puffiness of the feet. There was also a little puffiness about the eyes. There was no spasm or paralysis. The knee-jerks were equal and normal. There was no enlargement of the peripheral lymph nodes. There were no hemorrhages into the skin and no eruption or scars of old eruptions.

BLOOD.

Hemoglobin,	20% (normal = 70%)
Red corpuscles,	1,492,000 (normal = 5,500,000 to 6,000,000)
White corpuscles,	11,000 (normal = 10,000 to 14,000)
Small mononuclears,	68% (normal = 40% to 50%)
Large mononuclears,	7% (normal = 10%)
Polynuclear neutrophiles,	21% (normal = 35% to 45%)
Eosinophiles,	4% (normal = 1% to 5%)

The red corpuscles showed marked variation in size, the tendency being toward large forms. There was slight poikilocytosis and moderate polychromatophilia, but no stippling. Three normoblasts were seen in counting one hundred white cells. Some of the white cells were very large, looking like large cells from the bone marrow, and were throwing off blood plates. There was a large increase in the number of blood plates. No malarial organisms were seen.

Diagnosis. It is very hard to believe that, in the absence of hemorrhages, the anemia developed as rapidly as the parents affirm. The blood picture is that of a more chronic condition, and it seems probable, therefore, that the parents did not notice the condition until it was fully developed. It is also difficult to believe that the painting of the house or the mother's menstruation had anything to do with its development. The absence of stippling of the red cells is much against lead poisoning. Menstruation sometimes causes disturbances of digestion, but not anemia. It is more probable that the breast milk, while suitable in other ways, was deficient in iron, and that after the reserve supply in the liver was exhausted the anemia developed gradually. Scurvy can be ruled out as a cause on the absence of tenderness and swelling of the extremities and of hemorrhages. Malaria can be excluded on the absence of plasmodia in the blood.

The morphological changes in the red corpuscles, the predominance of the large over the small forms of red cells, the presence of nucleated cells and the large percentage of mononuclear leucocytes would in the adult point strongly toward pernicious anemia. The tendency common to all the anemias of infancy to revert to a younger type of blood and the normal preponderance of mononuclear leucocytes and of

greater variation in their size make these points of practically no importance in the diagnosis of pernicious anemia in infancy. In all probability, moreover, pernicious anemia does not occur at this age. The large number of blood plates present in this instance would exclude it, even in an adult.

Acute lymphatic leukemia in an aleukemic stage is suggested to a certain extent by the changes in the red cells and the comparatively large proportion of mononuclear leucocytes. The absence of enlargement of the spleen and lymph nodes and the age are much against it. The slight significance of the changes in the red cells and of the excess of mononuclear leucocytes has already been explained. The large number of blood plates practically excludes leukemia.

There is nothing about the blood picture which is in any way inconsistent with a secondary anemia in infancy. A diagnosis of SECONDARY ANEMIA is, therefore, justified, a possible cause being a deficiency of iron in the mother's milk.

Prognosis. The condition of the blood will undoubtedly improve rapidly if iron is given.

Treatment. The baby has done so well in every other way on its mother's milk that it is unwise to wean it, since any deficiency of iron in the milk can be very easily remedied by the administration of iron. This may be given by mouth in the form of the saccharated carbonate or of ferratin. When the anemia is as marked as it is in this instance it is better, however, to give it subcutaneously, because the improvement begins so much sooner and is so much more rapid than when it is given in the ordinary way. The best form of iron for subcutaneous use is the aqueous solution of the citrate. This can be put up in pearls and sterilized, and when prepared in this way remains sterile indefinitely. It is not irritating. If given subcutaneously, the injection rarely causes much pain, but, if given intramuscularly, it is often very painful and sometimes causes slight symptoms of shock. It must be given with a glass syringe with asbestos packing and a platinum needle. The syringe and needle must, of course, be sterilized. The dose for this infant is three quarters of a grain, every other day.

CASE 79. Jennie R., the daughter of healthy parents, was one of twins. The other had always been well. Another child was well, while a fourth had died in infancy of "summer complaint." She was nursed for five weeks, after which she was given modified milk, prepared at a laboratory, for three weeks. She had been fed since this time on a modified milk, prepared at home. The mixture, which was a weak one, had not been changed, however, for seven months. During this time she had had no disturbance of digestion, but had gained very slowly. She had a slight attack of diarrhea when nine months old, which yielded quickly to treatment and was followed by constipation. Since then she had taken a stronger modification of milk and had had no dis-

FIG. 7. JENNIE R. CASE 79.

turbance of digestion. She was seen when ten months old because she was not thriving.

Physical Examination. She was fairly developed and nourished. There was moderate pallor of the skin and mucous membranes. The anterior fontanelle was 3 cm. in diameter and level. The head was flattened on top and behind, but there was no craniotabes. There were two teeth. She sat alone feebly, but with the spine straight. There was a marked rosary. There was slight retraction of the chest at the insertion of the diaphragm. The heart and lungs were normal. The abdomen was distended but otherwise normal, except for a slight umbilical hernia. The upper border of the

liver flatness was at the upper border of the fifth rib; the lower border of the liver was palpable 3 cm. below the costal border in the nipple line. The spleen was felt running out from beneath the costal border in the left anterior axillary line to the right of the umbilicus, then downward and backward to the left anterior superior spine and backward into the loin. The surface was smooth, the consistency firm. The notch was felt distinctly in the left nipple line, midway between the costal border and the navel. The extremities were normal except for a moderate enlargement of the epiphyses at the wrists. There was a slight general enlargement of the peripheral lymph nodes. She weighed ten pounds and two ounces.

The urine was pale, acid, of a specific gravity of 1,015 and contained no albumin or sugar.

BLOOD.

Hemoglobin,	40% (normal = 70%)
Red corpuscles,	4,000,000 (normal = 5,500,000 to 6,000,000)
White corpuscles,	18,750 (normal = 10,000 to 12,000)
Small mononuclears,	34.4% (normal = 40% to 50%)
Large mononuclears,	12.6% (normal = 10%)
Polynuclear neutrophiles,	51% (normal = 35% to 45%)
Eosinophiles,	.2% (normal = 1% to 5%)
Myelocytes,	1.8%

The red corpuscles showed marked variation in size, shape and staining reaction. There was no tendency to large forms, but a slight tendency to oval forms. Sixteen normoblasts and nine megaloblasts were seen in counting five hundred white corpuscles.

Diagnosis. The flattening of the head, the rosary, the retraction of the chest at the insertion of the diaphragm and the enlargement of the epiphyses at the wrists are signs of rickets, as is probably the delay in the eruption of the teeth. The general enlargement of the peripheral lymph nodes is merely a manifestation of a disturbance of the nutrition. The pallor and the changes in the blood show that she has an anemia. The presence of myelocytes, megaloblasts and such marked morphological changes in the red corpuscles would suggest, in an adult, pernicious anemia. In an infant, how-

ever, they are merely evidences of the tendency of the blood to revert to a younger type. The greater relative diminution in the percentage of hemoglobin than in the number of red corpuscles, 57% against about 70%, is characteristic of secondary anemia in infancy. (See Case 77.) The leucocytosis may or may not be directly connected with the anemia. It is not at all uncommon in secondary anemia in infancy, however, and is of no especial significance. The blood changes are, therefore, entirely consistent with those of secondary anemia.

There is, in addition, a marked enlargement of the spleen. What is the connection, if any, between the rickets, the anemia and the enlargement of the spleen? Is any one of them the cause of the others, or are they all manifestations of some common cause? It is certain that the anemia and the splenic tumor could not have caused the rickets. Could the rickets have caused the anemia and splenic tumor? While it is conceivable that they might have, the chances are very much against it, because the study of large series of cases shows that there is no connection whatever between the severity of the rickets and that of the anemia and the size of the spleen, many babies showing marked rickets and no anemia, others mild rickets and severe anemia, and so on. In the same way, marked enlargement of the spleen is often found in connection with mild rickets and no enlargement of the spleen in some of the most marked cases. The study of other series of cases shows that there is no connection between the size of the spleen and the changes in the blood, very marked changes being present in the blood when the spleen is not enlarged, very slight when the spleen is much enlarged, and so on. It seems reasonable to conclude, therefore, that the rickets, the anemia and the enlargement of the spleen are all manifestations of some common cause. This cause is not hard to find. It is undoubtedly the disturbance of nutrition due to the prolonged use of too weak a food.

The combination of marked changes in the blood and splenic tumor, as is present in this instance, has often been set aside as a special disease and described under various names, the most common of which is anemia infantum pseudoleukemica.

The combination is always, however, as in this instance, accidental, and does not constitute a specific disease. The characteristics of the anemia are, as already shown, those of secondary anemia in infancy, and the enlargement of the spleen is merely a manifestation of the same disturbance of nutrition which is responsible for the anemia. It is better to speak of it, therefore, as SECONDARY ANEMIA WITH SPLENIC TUMOR.

Prognosis. The prognosis is perfectly good. When the underlying disturbance of nutrition is corrected the spleen will diminish rapidly in size and the anemia will quickly improve. The spleen will probably not be palpable after two or three months and the blood will be normal at least as soon.

Treatment. The treatment is regulation of the diet to correct the disturbance of nutrition. The administration of iron will also hasten the return of the blood to normal. The following mixture is a suitable one for her:

Fat,	4%
Sugar,	7%
Proteids,	2.50%
Starch,	0.75%

There is no indication for the addition of an alkali. Six feedings of five ounces will much more than supply the caloric needs indicated by her weight, but will probably be no more than are required when her age and surface area are taken into consideration.

One or two tablespoonfuls of beef juice, once daily, given at the same time as one of her feedings, will aid in supplying the needed iron. It will be wiser, however, to give iron in addition. It may be given as the saccharated carbonate or in the form of ferratin. The dose of the former is three grains; that of the latter, two grains, three times daily.

CASE 80. Lester J. had always been well, but a little delicate. A slight enlargement of the cervical lymph nodes was noticed about the first of June. It had not increased materially up to July 10, when he came down with scarlet fever. The scarlet fever was of a very mild type and he was out of quarantine August 13. The swelling in the neck increased very rapidly after the onset of the scarlet fever. The temperature rose again August 20 and ran between 103° F. and 104° F. Enlargement of the spleen was noticed for the first time August 23, but may have been present before, as it had not been looked for until that time. The size of the liver was not investigated. The mouth and throat became sore August 26, and several spots of membrane appeared in the mouth. A culture showed no diphtheria bacilli.. He had had no disturbance of digestion, looseness of the bowels or hemorrhages, and had not lost weight, strength or color. He had not seemed seriously sick until a few days before he was seen in consultation, August 27, when six years old.

Physical Examination. He was small, slight and flabby, but not very pale. There was an ulcerated area, the size of a dime, covered with false membrane, on the left side of the mouth. The whole throat was slightly reddened. The tonsils were moderately enlarged. The tongue was somewhat dry and slightly coated. There was no nasal discharge. There was a large mass of discrete, non-tender lymph nodes in the left side of the neck, which filled up the whole neck, extending forward even with the chin and downward to the clavicle. There were numerous small lymph nodes in the right side of the neck. There was no dullness under the manubrium or in the middle of the back, and the bronchial voice sounds did not extend below the seventh cervical spine, showing that there was no considerable enlargement of the bronchial lymph nodes. There was no venous hum in the neck. The heart, lungs and abdomen were normal. The upper border of the liver flatness was at the upper border of the fifth rib (normal is in the fifth space). The lower border was palpable, running from just above the right anterior superior spine, through a point two thirds the distance from the ensiform to the navel,

to the left costal border in the nipple line. The surface of the liver was hard and smooth, the edge rounded. The spleen was palpable, running out from the costal border between the left nipple and anterior axillary lines, downward and forward almost to the median line, backward to the left anterior superior spine and upward into the flank. The surface was smooth, the consistency hard, the edge rounded, the notch distinct. The extremities were normal. There was no spasm or paralysis. The knee-jerks were equal and normal. There were numerous lymph nodes, the size of marbles, in the axillæ and groins, and one, the size of a walnut, on the occiput. The epitrochlear lymph nodes were not palpable. The mouth temperature was 104° F.

The urine was high in color, extremely acid in reaction, and of a specific gravity of 1,032. It was loaded with urates, but contained no albumin or sugar. The sediment showed a few small round cells, but no casts.

BLOOD.

Hemoglobin,	70%
Red corpuscles,	3,520,000
White corpuscles,	128,000
Mononuclears (almost entirely lymphocytes),	99.2%
Polynuclear neutrophiles,	.6%
Myelocytes,	.2%

There was a very little variation in the size of the red corpuscles, but none in their shape or color. No nucleated cells were seen while counting five hundred white corpuscles.

Diagnosis. Without the examination of the blood the diagnosis would lie between lymphatic leukemia and Hodgkin's disease. The enlargement of the liver and the ulceration of the mouth would, however, make lymphatic leukemia the more probable. The examination of the blood proves conclusively that the trouble is LYMPHATIC LEUKEMIA. The enlargement of the lymph nodes preceded the attack of scarlet fever by six weeks. It is almost certain, therefore, that this was merely a coincidence and that it played no part in the etiology of the leukemia.

Prognosis. The prognosis is absolutely hopeless. He will probably not live more than one or two weeks.

Treatment. There is nothing to be expected from treatment. Arsenic and iron should be tried, however, with the hope that they may alleviate the condition and perhaps prolong life. The arsenic is best given in the form of Fowler's solution. It will be well to begin with three drops, three times a day, increasing the dose one drop daily until the physiological limit is reached. Other treatment must be symptomatic.

CASE 81. Mary C., three years old, was the only child of healthy parents. There had been no deaths or miscarriages. She was born at full term after a normal labor, was normal at birth and weighed eight pounds. She was nursed for seven months and did very well. Since then she had taken milk well, but it had been very hard to induce her to take other food. She had, nevertheless, been very well.

Seven weeks before she was seen in consultation she began to seem a little out of sorts and to lose color. The chief symptom had been anorexia and the greatest difficulty had been experienced in getting her to take anything, even milk. She had vomited occasionally, probably as the result of the forcing of food rather than of indigestion. There had been a tendency to constipation, which had been easily relieved by castoria. The movements had been well digested. Her only complaint was of being tired. She did not want to play with other children, but preferred to keep quiet or lie down. She had not lost weight but had steadily lost color. Purpuric spots had appeared on the legs a week previously. She had slept poorly and perspired freely. She had had no fever.

Physical Examination. She was well developed and nourished, but very pale. Her flesh was firm. There was no edema. The tongue was clean, the mouth and throat normal. There was a venous hum in the neck. The heart was normal, except for a slight systolic murmur at the pulmonic area, which was not transmitted. The lungs were normal. The liver and spleen were not palpable. The extremities were normal. There was no spasm or paralysis. The knee-jerks were equal and normal. There was no enlargement of the peripheral lymph nodes. There were a dozen or more purpuric spots, varying in size from that of a split pea to that of a dime, scattered over the arms and legs, there being more on the legs than on the arms.

BLOOD.

Hemoglobin,	25%
Red corpuscles,	2,560,000
White corpuscles,	15,400
Lymphocytes,	99%
Polynuclear neutrophiles,	1%

There was a little variation in the size and shape of the red corpuscles, but most of them were of normal size. There was moderate achromia, but no polychromatophilia. There was no stippling. One normoblast was seen for each one hundred leucocytes. No plasmodia or blood plates were seen.

Diagnosis. The diagnosis lies between a rather severe anemia, secondary to an insufficient or improperly balanced diet over a long period, with lymphocytosis, and lymphatic leukemia in an aleukemic stage. The symptomatology is consistent with either diagnosis. The diminution in the hemoglobin and in the number of the red corpuscles, as well as the morphological changes in them, are consistent with either condition. A percentage of lymphocytes as high as ninety-nine per cent is practically unheard of outside of lymphatic leukemia and is of far more importance in differential diagnosis than the comparatively slight increase in the total number of the white cells, because the number of white cells is often for a time but little increased in lymphatic leukemia. The absence of blood plates is of itself, moreover, sufficient to turn the scale in favor of leukemia, in which the blood plates are markedly diminished, while in secondary anemia they are normal or increased in number. The lymph nodes and spleen are usually, but not always, enlarged in lymphatic leukemia. The absence of such enlargement in this instance does not, therefore, rule it out. The diagnosis is, therefore, LYMPHATIC LEUKEMIA.

Prognosis. The prognosis is absolutely bad. She will probably not live more than one or two months.

Treatment. She must, if possible, be made to take a more varied diet. If she will not take sufficient food, it must be given through a stomach tube, passed through the mouth. There is little to be expected from medicinal treatment. Arsenic and iron should be tried, however, with the hope that they may alleviate the condition and perhaps prolong life. The arsenic is best given in the form of Fowler's solution. It will be well to begin with two drops, three times daily, increasing the dose one drop daily until the physiological limit is reached. Other treatment must be symptomatic.

CASE 82. Carl G. was the only child of healthy parents and was born at full term. His mother had had one miscarriage at six months, probably as the result of albuminuria. He lived on a farm in the country and had always drunk the unsterilized milk from a herd of cows which had for many years been infected with tuberculosis. He had had measles and chicken-pox as a baby and an abscess in the neck at two years, which was opened and healed well.

He began to be out of sorts about the first of January, when six and one-half years old. There were no very definite symptoms, however, so that a physician was not called until about the middle of March. He found that the boy was running an irregular temperature, which at times went as high as 103.5° F., and that he had an enlarged liver and a very large spleen. The urine showed nothing abnormal. The leucocytes numbered 6,000. Typhoid fever was suspected, but a Widal test was negative. He then improved for a time in every way and probably had little or no fever, although his temperature was not taken. He was up and about, played out of doors and seemed much like himself, except that he was easily tired.

The fever returned about the middle of August. The temperature was very irregular, most of the time being normal or subnormal, but reaching 103° F. or 103.5° F. for a time almost every day. Malaria was suspected, although there were no chills or sweating. Several examinations of the fresh blood failed, however, to show any plasmodia, and there was no change in the temperature when quinine was given. There had been no change in the size of the liver and spleen. The urine showed nothing abnormal. The red corpuscles numbered 3,700,000 and the white corpuscles, 6,000. He had lost some color. His appetite and digestion had been good throughout and he had not lost weight. He had had no cough, but several nosebleeds, one of them very severe. He was seen in consultation, August 29, when a little more than seven years old.

Physical Examination. He was fairly developed and nourished, but moderately pale. He did not look especially sick. His tongue was clean and moist, his teeth poor. The

nose and throat were normal. There was no venous hum in the neck. The heart and lungs were normal. The abdomen was considerably enlarged, but there were no evidences of fluid and no masses were felt. The superficial abdominal veins were not enlarged. The upper border of the liver flatness was at the upper border of the fifth rib in the nipple line (normal is in fifth space) and at the upper border of the ninth rib in the scapular line (normal is at the tenth rib). The lower border of the liver was palpable, running out from the right flank, 4 cm. below the costal border in the right anterior axillary line, through a point two thirds the distance from the tip of the ensiform to the navel, and under the costal border in the left nipple line. The liver was not tender, its surface was smooth, its edge sharp. The spleen was palpable, running out from beneath the costal border in the left nipple line, downward and inward nearly to the navel, downward and outward to below the level of the left anterior superior spine, then backward into the flank, which it filled. It was firm, smooth and not tender. The edge was somewhat rounded, the notch distinct. The extremities were normal. There was no spasm or paralysis. The knee-jerks were equal and normal. There was no enlargement of the peripheral lymph nodes and no evidence of enlargement of the tracheo-bronchial lymph nodes. There was no edema. There was no eruption and no scars of old eruptions.

The urine was normal in color, acid in reaction, of a specific gravity of 1,020, and contained neither albumin nor sugar. The sediment showed nothing abnormal.

BLOOD.

Hemoglobin,	90%
Red corpuscles,	3,520,000
White corpuscles,	5,700
Mononuclears (the majority small),	60.0%
Polynuclear neutrophiles,	38.7%
Myelocytes,	1.3%

The red corpuscles showed no changes in size, shape or coloring, and no nucleated cells or plasmodia were seen.

Diagnosis. The diagnosis lies between lymphatic leu-

kemia in an aleukemic stage, Hodgkin's disease and that very indefinite class of cases known as splenic anemia or anemia with splenic tumor. Tuberculosis, which is suggested by the prolonged use of milk from a tuberculous herd, can be excluded by the absence of signs of tuberculosis elsewhere, the slight impairment of the general condition after six months, the fact that the liver and spleen are apparently alone involved and that the enlargement of these organs is regular. A tuberculin test would not be of much assistance. If negative, it would, of course, exclude tuberculosis, but, if positive, it would not prove that the enlargement of the liver and spleen and the fever are tubercular in origin. Syphilis can be ruled out on the good family history, the previous good health, the fever and the absence of all other signs of syphilis in the past or present. Cirrhosis of the liver is rendered very improbable by the absence of cause, ascites, jaundice and enlargement of the superficial abdominal veins, the fever and the relatively great enlargement of the spleen.

Lymphatic leukemia in an aleukemic stage can be practically eliminated on the duration of the illness, the low white count on several occasions (the aleukemic stage usually being a short one), the absence of morphological changes in the red cells and the marked enlargement of the liver and spleen without enlargement of the lymph nodes.

The fever, the condition of the blood, the enlargement of the liver and spleen and the relatively slight impairment of the nutrition are all consistent with Hodgkin's disease. It is almost unheard of, however, to have so much enlargement of the liver and spleen without enlargement of either the superficial or deep lymph nodes. Hodgkin's disease can, therefore, be excluded.

The most probable diagnosis is, therefore, splenic anemia, or better, ANEMIA WITH SPLENIC TUMOR. This is, however, not a very satisfactory diagnosis because it does not describe a definite pathological entity, but is merely a term applied to a group of cases in which there is enlargement of the spleen and anemia, but of which the pathology and etiology are very varied. It is at present, however, impossible to classify them any more accurately.

Prognosis. The prognosis is very uncertain. He may gradually improve and grow up with a large liver and spleen, which do not cause any symptoms or inconvenience, or they may both finally return to their normal size. He may, on the other hand, fail rapidly and die in a few months or live on for some years and then die. The chances are that he will not live more than a year.

Treatment. The treatment must, in the main, be hygienic and symptomatic. It will be well to try arsenic thoroughly. It is best given in the form of Fowler's solution. It will be well to begin with three drops, three times a day, increasing the dose one drop daily until the physiological limit is reached. It should then be continued, in doses somewhat below the physiological limit, for several months. If he does not improve, or continues to fail, splenectomy ought to be considered, because, while it is a serious operation and if successful does not always relieve the symptoms, it sometimes results in a cure.

SECTION XI.

DISEASES OF THE NERVOUS SYSTEM.

CASE 83. Ronald P., six years old, was the only child of very nervous parents. His father was alcoholic, but there was no history of syphilis. His home surroundings were very exciting and he was under little control. He had an ungovernable temper and was in the habit of biting, fighting and swearing when opposed. He had had the croup every winter, but no other affections of the respiratory tract. His diet was a fair one for the country, and his appetite and digestion were good. He had had no other illnesses.

Three months before he was seen in consultation he began to throw his arms up over his head in a peculiar manner, the motions always being the same. A diagnosis of chorea was made by his physician and he was given Fowler's solution. Soon after taking this he began to clear his throat constantly, while there was no diminution in the movements of his arms. More than nine drops of Fowler's solution a day caused edema of the eyelids, congestion of the conjunctivæ and a nasal discharge. He had taken it fairly regularly in small doses, however, up to the time he was seen. He had begun to shrug his shoulders about six weeks before. The peculiar motions of the arms, the clearing of the throat and the shrugging of the shoulders all persisted. The movements and the clearing of the throat ceased during sleep. He did not seem sick in other ways.

Physical Examination. He was fairly developed and nourished and of good color. He was very excitable and was constantly clearing his throat and shrugging his shoulders during the examination. He could keep still when he tried. The pupils were equal and reacted to light and accommodation. There was no coryza and he kept his mouth shut. Examination with the finger showed no adenoids. The throat was normal. The tongue was clean and was protruded

without tremor. The heart, lungs and abdomen were normal. The liver and spleen were not palpable. The extremities were normal. There was no spasm or paralysis. The knee-jerks were equal and slightly diminished. Kernig's and Babinski's signs were absent. There was no ankle clonus. The cremasteric reflexes were normal, the abdominal lively. The genitals were normal. There was no enlargement of the peripheral lymph nodes. There was no eruption and no irritation of the skin.

Diagnosis. The diagnosis lies betweeen chorea and habit spasms. The clearing of the throat is not at all like chorea, the motions are limited in number and always the same, he can control them to a considerable extent, and there is no tremor of the tongue. Chorea can, therefore, be excluded and a positive diagnosis of HABIT SPASMS made. These are especially likely to develop in children of neurotic parentage and living in exciting surroundings, as in this instance. There is usually some local cause for the development of the individual spasms, such as an uncomfortable hat, a badly fitting collar or a poorly adjusted suspender. No definite cause for the motions of the arms and the shrugging of the shoulders was made out in this boy. The irritation of the nose and throat caused by the arsenic was presumably the primary cause of the clearing of the throat; its continuance is due to the underlying neurotic condition.

Prognosis. These habit spasms never lead to chorea. They are likely to persist for long periods, however, or to be replaced by others, because, even if the local cause can be found and removed and the individual spasm relieved, it is very difficult to get at the underlying trouble, that is, the inherited neurotic temperament. The prognosis is worse than usual in this instance, because the home surroundings are so bad and because he has not been controlled in the past.

Treatment. The treatment of habit spasms can be divided into three parts: that directed to the removal of the local cause of the individual spasm, if it is still present; that of the individual spasm; and that directed to the improvement of the underlying neurotic condition. Nothing was found in this instance to account for the peculiar motions of the

arms or the shrugging of the shoulders. The local cause, whatever it was, must, therefore, have been accidentally remedied. The best treatment for the shrugging of the shoulders and the motions of the arms is to have him make these motions before a mirror for several minutes, several times daily. What is at present an involuntary act will come by practice under the control of the will again and hence be performed only voluntarily. The arsenic, which was, by the irritation which it caused, presumably the original cause of the clearing of the throat, has already been stopped. It is possible, however, that some local irritation still persists. This can be treated by some mild alkaline or oily spray like the liquor antisepticus alkalinus of the Pharmacopeia, or the following mixture:

Menthol,	1 gr.
Camphor,	1 gr.
Liquid albolene,	1 oz.

The treatment of the underlying neurotic condition is a very difficult matter. It includes, in the first place, regulation of his home surroundings in general. It is probable that little can be done in this direction. His diet, exercise, amusements and rest must all be carefully laid out. He must have much fresh air and ought not to go to school at present. Drugs will probably not be of much assistance, although the tincture of nux vomica in five-drop doses, three times daily, before meals, and eisenzucker or ferratin in five-grain doses, three times daily, after meals, may be of some assistance.

CASE 84. Porter M., four years old, was the fourth child of healthy parents. He was born at full term after a normal delivery and was normal at birth. His father had had several convulsions when a child. One of his brothers, ten years old, was in an asylum for epileptics for convulsions which began after a fall out of bed at two years.

He had always been perfectly well up to six months before, when, in common with his sister, he had an acute attack of fever and vomiting, apparently due to drinking milk from a sick cow. Both had convulsions at the onset of the illness. His sister had no more. He was in bed four days and had several convulsions during that time. His next convulsion was two weeks after he was up and about. Since then he had had a great many convulsions, lasting from one to five minutes. His mother thought that he did not lose consciousness in them. He never frothed at the mouth, bit his tongue or passed urine or feces. He also had many very short attacks in which he apparently lost consciousness momentarily, dropped things, stared for an instant and so on, but never fell down. Various diets had been tried without effect. He was for some time on a strictly vegetable diet, at another had nothing but malted milk for a month, and at another only milk, bread and cookies. His appetite was good and he had no signs of indigestion except that he was very constipated. The movements at times contained mucus, but were otherwise normal. He had been circumcised and had adenoids removed without any effect on the convulsions. His mental condition was perfectly normal.

About six weeks before he was seen in consultation the convulsions became much more frequent and severe and bromide was begun. Since small doses had no effect on the convulsions, the dosage was increased until he was taking enormous amounts with the addition of chloral. Since taking the bromide he had become so stupid that he could not hold up his head or hold things in his hands, kept his mouth open and drooled constantly. His appetite had fallen off and he had lost considerable weight. The severe attacks were relieved by the bromide, but he continued to

have the mild ones. The bromide had been diminished during the last week and he had begun to be more like himself.

Physical Examination. He was fairly developed and nourished and moderately pale. He took very little notice of his surroundings, although at times he brightened up momentarily and appeared perfectly normal mentally. He held up his head with some difficulty and could hardly sit alone. He could walk with help, but very feebly and unsteadily. He kept his mouth open and drooled constantly. There was no spasm or paralysis of any of the muscles controlled by the cranial nerves. The fundi of the eyes showed nothing abnormal. The ear-drums were normal. The tonsils were large, but not inflamed. The tongue was considerably coated. The heart, lungs and abdomen were normal. The lower border of the liver was just palpable in the nipple line. The spleen was not palpable. The extremities were normal. There was no spasm or paralysis. All his motions were, however, unsteady and feeble. The knee-jerks were equal and normal, as were the abdominal and cremasteric reflexes. Kernig's and Babinski's signs were absent. The sensation to touch and pain was slightly dulled. He was circumcised. There was no enlargement of the peripheral lymph nodes.

The urine showed nothing abnormal.

Diagnosis. The bromide intoxication obscures the diagnosis to a certain extent. There is but little doubt, however, that the stupidity and muscular weakness are due to the bromide and not symptoms of any cerebral disease. The omission of the bromide will quickly settle this point. The absence of spasm, paralysis, changes in the reflexes and of Kernig's and Babinski's signs, and the normal condition of the fundi, prove that there is no gross cerebral lesion. The diagnosis lies, therefore, between "idiopathic" epilepsy and reflex convulsions, presumably from disturbance in the digestive tract, since all other causes of reflex convulsions are excluded by the physical examination. The family history is of but little aid, as the tendency to convulsions from slight causes, shown in the father and sister, balances the epilepsy in the brother. The onset of the convulsions

with the onset of an acute disease is somewhat against epilepsy, but does not by any means exclude it, because the first convulsions may have caused some cerebral lesion which resulted in epilepsy, or the acute disease may have lighted up a latent epilepsy. The nature of the attacks, which, according to the parents, are not accompanied by an initial cry or loss of consciousness, is somewhat against epilepsy, but does not exclude it, because a cry is often lacking in epilepsy and because the parents may be wrong as to the retention of consciousness. In fact, they probably are, because if he loses consciousness in the slight attacks he almost certainly does in the more severe ones. On the other hand, the symptoms of disturbance in the digestive tract are hardly severe enough to make it probable that there is sufficient intestinal irritation or toxic absorption from the intestines to cause so many and so severe convulsions. Regulation of the diet and of the bowels has had, moreover, no effect on the number or severity of the convulsions. The chances are, therefore, that the condition really is EPILEPSY. The only way to settle the diagnosis positively, however, is by careful regulation of the diet, bowels and general routine for a considerable time. If the convulsions persist, the diagnosis of epilepsy will be confirmed; if they cease, it will have to be changed to reflex convulsions.

Prognosis. The prognosis depends on the final diagnosis. If this is epilepsy, there is a possibility of recovery, but the chances are very much against it. The convulsions will, however, probably become much less frequent but more severe.

Treatment. The bromide should be stopped for the present in order to determine positively as to his mental and physical condition. He should be put on a diet of milk and starches to diminish intestinal putrefaction and his bowels kept freely open, preferably with some mild saline, like phosphate of soda. There is no objection to adding fruit and green vegetables to the diet for their laxative action. He must, of course, be carefully watched to prevent him from injuring himself during the attacks.

CASE 85. Mary B., two years old, was the second child of extremely neurotic parents. She had always been far ahead of her age in her mental development. She was not nursed but was fed during the first year on modified milk, prepared at home, and then on a very careful diet. She had always been very constipated and had had various laxatives, enemata and suppositories almost constantly since birth. Her digestion, except for occasional acute upsets, had been otherwise fairly good. She had had no other illnesses except two attacks of bronchitis and a mild attack of pyelitis. She sat up alone at eleven months and walked at twenty months. She cut her first tooth at ten months, but had eight when a year old.

She began to have convulsions when a year old. She almost always had one or two, and often as many as half a dozen, daily. The longest interval between convulsions during the year had been ten days. They almost always came on when she was angry, frightened or in pain. A fit of crying almost always ended in a convulsion. She would often have one if she was refused anything which she wanted. A fall or a bump was usually followed by one. She often had one during defecation, if the movement was hard. She was seen in one, which came on as the result of a rectal examination. She cried, held her breath and became a little blue. She then gave a short cry, stiffened out, raised her clenched hands before her face and then slowly dropped them. She was not cyanotic, breathed regularly during the attack, made no other movements, lost consciousness and passed both urine and feces. The attack did not last more than half a minute. She was dull and pale for several minutes after it. Her mother said that this was an unusually severe one and that many of them were merely slight "fainting spells." The attacks occurred more frequently when the bowels were not moving freely, when she was cutting teeth, when she was not kept free from excitement, and when she was below par physically. She had never had any definite attacks of laryngismus stridulus, and Trousseau's symptom and the facial phenomenon had been absent at repeated examinations.

Physical Examination. She was small but fairly nourished.

Her flesh was firm and her color good. Her mental development was nearer that of a child of three than of two years. The anterior fontanelle was not quite closed. There was no craniotabes. She had sixteen teeth. Her mouth and throat were normal and her tongue clean. There was no spasm or paralysis of any of the muscles controlled by the cranial nerves. There was a slight rosary. The heart, lungs and abdomen were normal. The liver was just palpable in the nipple line. The spleen was not palpable. The extremities were normal. There was no spasm or paralysis. The knee-jerks were equal and normal. Kernig's and Babinski's signs were absent, as were Trousseau's sign and the facial phenomenon. There was no enlargement of the peripheral lymph nodes.

The urine was pale in color, acid in reaction and of a specific gravity of 1,015. It containd neither albumin nor sugar. The sediment showed nothing abnormal.

Diagnosis. The absence of Trousseau's symptom, the facial phenomenon and attacks of laryngismus stridulus shows that the convulsions are not manifestations of the spasmophilic diathesis (see Cases 53 and 88). The absence of spasm and paralysis, the normal condition of the reflexes, the absence of Kernig's and Babinski's signs and the normal mental development rule out any gross cerebral lesion. The diagnosis lies, therefore, between "idiopathic epilepsy" and reflex convulsions from slight causes in a child with an unusually irritable nervous organization. The character of the convulsions and their long continuance are in favor of epilepsy. The strongest point against it is the fact that the convulsions never occur without some definite cause. This fact, while it does not rule out epilepsy, is important enough to more than counterbalance the character and continuance of the convulsions and to make epilepsy very improbable. The chances are, therefore, against epilepsy and in favor of Reflex Convulsions. Time alone, however, can settle the diagnosis positively. If they persist after she grows older and can be better controlled, the diagnosis will have to be changed to epilepsy.

Prognosis. The convulsions will probably gradually

diminish in frequency and finally cease as she grows older and can be reasoned with and taught self-control:

Treatment. The treatment consists in regulation of her diet and bowels, and in training her in self-control. This will, however, be very difficult because crossing her is very likely to bring on a convulsion. She must be made to obey and to lead a normal life even if the number of convulsions is temporarily increased, as in this way only can she be controlled. Quiet surroundings and freedom from excitement are especially important in this connection. There is no direct indication for medicinal treatment. Everything which will tend to improve her physical condition is, of course, of importance. The most minute details of her life must be looked into and regulated.

CASE 86. Helen T.'s parents were feeble but not alcoholic or especially nervous. One other child was well. There had been no deaths or miscarriages.

She was born at full term after a normal labor, and seemed normal at birth. She had always been fed on condensed milk and recently had had crackers in addition. She had never been ill, except for a mild attack of diarrhea a month before. She had always been backward, but her parents had not thought much of it until she was sixteen months old. She had never learned to sit up alone and could say but one or two words. She was usually quiet and good-natured, but moaned occasionally. She was seen when two years old.

Physical Examination. She was fairly developed and nourished, but pale and flabby. Her expression was dull and stupid. She stared about without taking much notice, but could see and hear. She usually lay quietly, with the exception of coarse movements of her arms and fingers. She apparently amused herself by making a peculiar sucking noise and frequently made grimaces by putting out her tongue and rolling up her eyes. Her cry was hoarse but she said nothing. Her head was of good shape. The fontanelles were closed. The circumference of the head was 45 cm. (normal is 48 cm.); that of the chest, 43 cm. (normal is 51 cm.). Her hair was soft and fine. The palpebral openings were narrow and the eyes appeared deep-set. The outer canthi were slightly higher than the inner. The epicanthic folds were not marked. The pupils were equal and reacted to light. The nose was short and flat and wider than usual between the eyes. She had twelve teeth. Her tongue was somewhat enlarged, but moist and smooth. She kept it protruded beyond the lips most of the time. A moderate amount of adenoids was felt with the finger. The throat was otherwise normal. The neck was of normal length and there were no supraclavicular pads. The thyroid was of normal size. She was able to hold up her head, but not to sit alone. There was a marked curve of weakness. There was a slight rosary. The heart and lungs were normal. The abdomen was slightly enlarged, but otherwise normal. The liver and spleen were not palpable. The extremities were of normal

length, the distance from the anterior superior spine to the sole being forty-six per cent of the total length. The epiphyses at the ankles were slightly enlarged. The hands were of good shape, except that the little fingers curved in rather more than usual. She had no idea of standing up or what her legs were for. There was no spasm or paralysis. The knee-jerks were equal and normal. Kernig's sign was absent. There

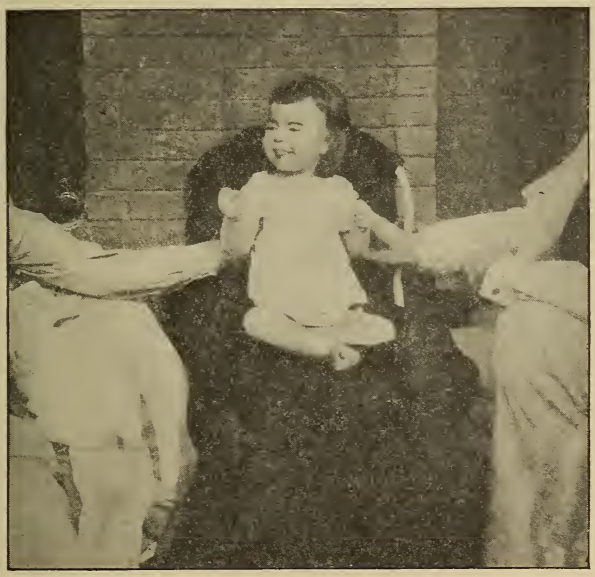

Fig. 8. Helen T. Case 86.

was no enlargement of the peripheral lymph nodes. The skin was normal.

The urine was cloudy, straw-colored, acid in reaction, and contained neither albumin nor sugar. The sediment consisted of amorphous phosphates.

Blood.

Hemoglobin,	70%
Red corpuscles,	5,192,000
White corpuscles,	12,400

Diagnosis. This child is, of course, an idiot. The history and the fact that she sees rule out amaurotic idiocy. The normal size and shape of the head exclude hydrocephalic and

microcephalic idiocy. The absence of spasm, paralysis and exaggerated reflexes shows that there is no gross cerebral lesion, either congenital or as the result of hemorrhage at birth. The enlargement and protrusion of the tongue and the expression of the face suggest cretinism to a certain extent. This can be excluded, however, on the fineness of the hair, the normal condition of the skin, the absence of supraclavicular pads, the normal length of the neck and of the extremities and the normal shape of the hands and feet. There are many points about the physical examination which are in favor of the Mongolian type of idiocy. These are the hoarse cry, the narrow palpebral openings, the obliqueness of the eyes, the distance between the eyes, the short and flat nose, the enlargement of the tongue and the incurvation of the little fingers. The incurvation of the little fingers is so common, however, even in normal persons, that it is of little importance. It is true that the back of the head is of good shape, that the epicanthic folds are not marked, that the angle of the eyes is but very little increased and that the tongue is not dry and fissured. Marked changes in the tongue almost never develop as early as two years, however, and the head is not always flattened anteroposteriorly in Mongolian idiocy. The angle of the eyes and the development of the epicanthic folds are merely questions of degree. The diagnosis of MONGOLIAN IDIOCY is, therefore, justified.

Prognosis. Mongolian idiots are extremely susceptible to infection and resist disease very badly. She will probably, therefore, not live many years. There is no prospect that she will become a useful member of society or able to support herself. She will probably be able to walk and can probably be taught to feed herself and be cleanly in her habits. Little more than this can be expected.

Treatment. She should be placed in some institution for the feeble-minded, because children are better taught and better cared for in such institutions than at home and because, when in an institution, they do not serve as bad examples to other children.

CASE 87. Joseph C. was the first child of healthy Jewish parents. There had been no miscarriages. He was born at full term after a normal labor and was normal at birth, although very small. He was breast-fed entirely until he was eight and one-half months old, after which he was rationally fed. His digestion had always been good. He "acted just like any other baby" until he was three or four months old, smiled, took things in his hands, was interested in his surroundings and kicked out with his legs. He had not learned to hold up his head, however. He then ceased to develop mentally and soon began to deteriorate, so that when he was eight months old his parents were sure that he was "not bright." He became dull and stupid, did not notice, would not hold things in his hands and seldom moved. Rigidity of the extremities developed when he was fourteen months old, and twitching of the face when he was seventeen months old. He began to have convulsions a few days before he was seen, when eighteen months old. He had taken his food well up to a few days before, when he began to have difficulty in swallowing.

Physical Examination. He was fairly developed and nourished, but markedly pale. His head was of good shape and of normal size. The anterior fontanelle was 3 cm. in diameter and slightly depressed. There was no craniotabes. He was unable to hold up his head, which rolled limply from side to side. He heard but could not see. The pupils were equal and reacted to light. His expression was vacant. He kept his mouth open and drooled constantly. He had six teeth. The throat was normal and there were no adenoids. He could not sit up. The back showed a marked curve of weakness. There was a moderate rosary. The heart, lungs and abdomen were normal. The liver was palpable 1 cm. below the costal border in the nipple line. The spleen was not palpable. He lay on his back and seldom moved, except to turn his head. He held his hands flexed at the wrists, with the fingers partially flexed. There was, however, very little resistance to passive extension of the fingers and hands. The arms dropped flaccidly when lifted up. He usually held his legs and feet extended. There was at times marked opposition to

passive motions; at others, the legs were perfectly flaccid. The knee-jerks were usually absent; when present, they were very feeble. The cremasteric and abdominal reflexes were present. There was no ankle clonus. Kernig's and Babinski's signs were absent. Sensation to both touch and pain was present. There was a slight general enlargement of the peripheral lymph nodes. The rectal temperature was 99° F., the pulse 110, the respiration 30. He weighed seventeen and one-half pounds.

The urine was high in color, acid in reaction and of a specific gravity of 1,024. It contained neither albumin nor sugar. The sediment showed an excess of urates, but no cells or casts.

FIG. 9. JOSEPH C. CASE 87.

Diagnosis. This boy is undoubtedly an idiot. His race, the normal condition at birth, the normal development for some months followed by progressive physical and mental deterioration, taken together with the general flaccidity and the blindness, form a combination so characteristic of AMAUROTIC IDIOCY that a positive diagnosis of this condition is justified without further examination. There is no other condition which shows just this combination of history and physical signs. The diagnosis should, however, be verified by an examination of the fundi which in this disease present a picture which is absolutely pathognomonic. This is a dark, reddish-brown, circular spot occupying the site of the macula lutea and surrounded by a whitish zone about twice the di-

ameter of the optic disk. The eyes of this boy were examined and the characteristic picture found, thus verifying the diagnosis.

Prognosis. The prognosis is absolutely hopeless. If he is not fed with a tube, he will quickly starve to death. If he is fed with a tube, he may live for many months. Sooner or later, however, he will die of bronchopneumonia or some other intercurrent disease.

Treatment. There is no treatment for this disease. He must be fed with a stomach tube and taken care of until he dies.

CASE 88. Jacob A. was the child of healthy parents. One other child was well, two had died of "summer complaint" and three of diphtheria. There had been no miscarriages.

He was fed from birth on a mixture of three parts of whole milk and one of water. When five months old he was given tea and crackers, and probably other things also, in addition. He had always done well, had not vomited and had had normal movements. He began to cry almost constantly October 20. Swelling of the arms and legs appeared at the same time. He was seen October 22, when ten months old.

Physical Examination. He was well developed and nourished, but rather pale. He was perfectly conscious. The parietal and frontal eminences were moderately enlarged, and the head was somewhat flattened on top. The anterior fontanelle was 4 cm. in diameter and level. The pupils were equal and reacted to light. There was no craniotabes. He had two teeth. The gums, mouth and throat were normal. The tongue was clean. The ear-drums were normal. There was a moderate rosary. The heart and lungs were normal. The level of the abdomen was somewhat below that of the thorax, but nothing abnormal was detected in it. The liver was palpable 2 cm. below the costal border in the nipple line. The spleen was not palpable. The epiphyses at the wrists were slightly enlarged. There was a rather tense swelling of the feet and legs half-way to the knees, and of the hands and lower halves of the forearms. This swelling was not hot, tender or red. It did not pit on pressure. He held his arms partly flexed at the elbows and at the wrists. The hands were turned a little to the ulnar side. The fingers and thumbs were flexed sharply at the metacarpo-phalangeal joints and extended at the phalangeal joints, the thumb being inside the fingers. The legs were held partially flexed at the knees and partially extended at the ankles, with flexion of the toes at the metatarso-phalangeal and extension at the phalangeal joints. Any attempt to overcome the spasm in the arms and legs caused much pain. The knee-jerks could not be tested because of the spasm. Kernig's sign was absent. The facial phenomenon was absent. Trousseau's symptom could not

be tested because of the spasm. There was a slight general enlargement of the peripheral lymph nodes. The rectal temperature was 101° F., the pulse 110, the respiration 40. A few minutes after the examination he became entirely relaxed. The spasm returned again, however, in a short time.

The urine was pale, clear, acid in reaction, of a specific gravity of 1,010, and contained neither albumin nor sugar.

Diagnosis. Tetanus can be ruled out on the absence of trismus and the characteristic position of the extremities. Meningitis can be excluded on the normal mental state, the level fontanelle, the absence of involvement of the cranial nerves and of rigidity of the neck and the characteristic position of the extremities. The age of the baby, the good general condition, the intermittence of the paroxysms, the pain in association with them and the swelling of the extremities are all characteristic of tetany. The position of the extremities during the spasm is pathognomonic of TETANY and makes the diagnosis positive. The swelling of the extremities is undoubtedly nervous in origin and belongs in the class of the angioneurotic edemas. The enlargement of the frontal and parietal eminences, the flattening of the top of the head, the rosary and the enlargement of the epiphyses at the wrists are signs of rickets, as is probably the delayed dentition.

Tetany is not properly a disease but merely a manifestation of the spasmophilic diathesis. In this condition there is a marked increase in the nervous excitability, which shows itself in various ways, the most characteristic manifestations being laryngismus stridulus, tetany and convulsions. The spasmophilic diathesis is almost certainly due to some disturbance in the metabolism of calcium. It is uncertain whether this disturbance is or is not due to parathyroid insufficiency. There is in all probability a deficiency of calcium salts in the blood in the spasmophilic diathesis. His diet, which has been largely made up of cow's milk has never been deficient in calcium. The calcium in cow's milk is, however, not nearly as well utilized as that in human milk, so that he may well not have absorbed a sufficient amount. The rickets is, therefore, merely another manifestation of

disturbance of nutrition and not the cause of the paroxysmal contractions.

Prognosis. The prognosis depends very largely on whether or not he can get the best treatment. If he can, the paroxysms will quickly cease. If he cannot, they will probably continue and other manifestations of the spasmophilic diathesis are very likely to develop. There is no danger of death in a paroxysm of tetany, but he may die in an attack of laryngismus stridulus or during a convulsion.

Treatment. No treatment is necessary for the paroxysms unless they are more severe than at present. A bath at 110° F. is the best treatment. If the attacks become more severe, they can be controlled to a certain extent by bromide of sodium or potassium, in doses of from three to five grains, in an aqueous solution, given three or four times daily. The attacks will be less likely to develop if he is kept quiet and not disturbed.

The treatment of the spasmophilic diathesis consists in regulation of the diet. Human milk always quickly relieves this condition. A purely carbohydrate diet relieves it, but much less promptly and is, moreover, unsuitable for a baby of this age. A return to cow's milk in any form, at any rate until a considerable time has elapsed, almost invariably causes a return of the symptoms. The only rational food for this baby is, therefore, human milk. If he cannot get it, he must be given a starch and sugar solution for as long a time as is possible, due regard being paid to his general condition, and then gradually worked on to some modification of cow's milk.

It is possible that the administration of some of the calcium salts, like the lactate, might do good, but the indications are so doubtful and the results to be expected so slight compared to those obtained with human milk that they are hardly worthy of consideration. Parathyroid extract, in doses of one fifteenth of a grain, three times a day, would seem a more rational treatment, but has not been used enough to prove whether or not it is of any value.

CASE 89. Baby T. was born at full term after a normal first pregnancy. The membranes ruptured January 11 and much liquor amnii drained away. Labor began the afternoon of January 12. The pains were hard, but very little progress was made. He was finally delivered by high forceps, after a manual dilatation, at 3 A.M., January 13. The operation was an easy one and did not take over an hour. The head was considerably compressed at birth but the fontanelles did not bulge. He weighed six and one-half pounds and seemed all right in every way. He cried normally and passed both urine and feces. He was not put to the breast but took water well.

He suddenly stopped breathing and became deeply cyanotic at 8 P.M., January 13, seventeen hours after birth. He was brought around by artificial respiration, but had another similar attack about 9 P.M., which also required artificial respiration. He had breathed quietly and normally since then, but had not moved much and had not opened his eyes. A little twitching of the face was noticed during the morning of the 14th, and during the afternoon he moved his left arm constantly, but had no rigidity or convulsions. He took a little sugar and water during the day and passed both urine and feces. He became more stupid during the evening and could not be made to swallow. The pulse gradually fell during the day from 160 to 120. The rectal temperature varied between 99° F. and 99.5° F. He was seen in consultation at 10.30 P.M., January 14.

Physical Examination. He was well developed and nourished, and of good color. He could not be roused or made to move. His neck was flaccid. The head was of good shape and of normal size. The anterior fontanelle was 3 cm. and the posterior fontanelle 2 cm. in diameter. Both bulged a little. The sagittal and coronal sutures were $1\frac{1}{2}$ cm. wide and a little full; the other sutures were closed. The axes of the eyes were parallel. The pupils were a little smaller than a pinhead and did not react to light. A little dried blood was seen high up in the nostrils. The mouth and throat were normal. There was no facial paralysis and no marks of the forceps. The heart, lungs and abdomen were normal. The cord was healthy. The liver was palpable 1 cm. below the

costal border in the nipple line. The spleen was not palpable. The arms were held slightly flexed at the elbows and the hands were clenched. The spasm was, however, very easily overcome. There was no spasm of the legs. The knee-jerks were not obtained. There was no Kernig's sign. The rectal temperature was 99.5° F., the pulse 140, the respiration 24.

Diagnosis. The diagnosis lies between some cerebral lesion, intestinal toxemia and sepsis. The facts that he has had no food, that his bowels have moved freely and that his temperature is practically normal are sufficient, in connection with the positive signs of cerebral trouble, to exclude intestinal toxemia. The normal condition of the cord, the normal temperature and the absence of any local manifestations of sepsis rule out sepsis.

The age, lack of exposure and normal temperature exclude meningitis. The bulging of the fontanelles and sutures shows positively that there is an increase in the cerebral pressure. This was not present at birth. An internal hydrocephalus could hardly have developed in seventeen hours. Serous meningitis does not develop without a cause and is usually accompanied by fever. The only reasonable explanation for the increased cerebral pressure is, therefore, a hemorrhage. The gradual development of the symptoms of increased cerebral pressure is perfectly consistent with a slow capillary oozing, which is the usual form of hemorrhage occurring at or soon after birth. The presence of blood high up in the nostrils is almost pathognomonic of cerebral hemorhage, the blood coming through the cribriform plate. The diagnosis of CEREBRAL HEMORRHAGE is, therefore, justified. The diagnosis is so certain that it hardly seems necessary to do a lumbar puncture to confirm it. The spinal fluid does not always contain blood, moreover, when there is a cerebral hemorrhage, and the presence of blood does not always indicate cerebral hemorrhage, because it may be due to the wounding of some vessel during the puncture. The fact that the involuntary motions were confined to the left arm suggests that the hemorrhage is greater on the right than on the left side of the brain. This point is not of much importance, however, because, owing to the imperfect development of

the cortical centers and the general nervous excitability at this age, no very definite conclusions can be drawn from what would be important localizing symptoms in an older child or an adult.

Prognosis. He is almost certain to die if he is not operated upon. If he does not die, he will surely be paralyzed and probably feeble-minded. He will probably die during or soon after the operation. If he does not, he may still be paralyzed, but the paralysis will be less extensive than it will be if he is not operated upon. There is a reasonable chance, however, that the operation will relieve the symptoms and that he will develop normally.

Treatment. He should be operated on immediately. Delay will mean still further hemorrhage and more pressure on and damage to the brain.

CASE 90. Elsie L., two and one-fourth years old, was the first child of healthy parents. There had been no miscarriages. She was born after a very difficult instrumental vertex delivery at the end of a long labor and was almost dead at birth. She was not nursed, as she was too weak to take the breast. She did not thrive during infancy, but since then her general condition had been good. She had had no convulsions. She sat up alone at nine months and cut her first tooth at a year. She began to stand at sixteen months, but did not begin to walk at all until she was twenty-six months old. Her gait was then noticed to be very peculiar. She was brought because she did not walk well. She used her hands well, talked early and was bright mentally. She controlled the sphincters of the bladder and anus.

Physical Examination. She was well developed and nourished and of good color. Her tongue was clean and her mouth and throat normal. There was no rosary. The heart, lungs and abdomen were normal. The liver and spleen were not palpable. She talked well for a child of her age and seemed bright. There was no spasm or paralysis of any of the muscles supplied by the cranial nerves. There was no deformity of the spine, and it was normally flexible. There was no paralysis or spasm of the arms, and the reflexes of the arms were normal. She stood with her knees close together, her body flexed on the thighs, the knees partially flexed and the heels a little off the ground. When she walked the knees rubbed together and one leg crossed in front of the other. When lying down the legs could be straightened on the thighs and the feet brought to a right angle, but with some little difficulty. Separation of the legs was resisted and was impossible to more than a moderate extent. There was decided resistance to hyperextension of the thighs. The knee-jerks were equal, but much exaggerated. There was no ankle clonus. The sensation was normal. The legs were warm, of good color and not wasted. Kernig's sign was absent. Babinski's phenomenon was present on both sides. There was no enlargement of the peripheral lymph nodes.

Diagnosis. This little girl has a paraplegia with spasm. The spasm, exaggeration of the reflexes and normal sensation

rule out any lesion of the peripheral nerves. The spasm, exaggeration of the reflexes and absence of wasting rule out a lesion of the anterior horns, such as occurs in anterior poliomyelitis. Transverse myelitis, except from disease of the spine, almost never occurs at this age. There is no deformity of the spine in this instance and it is normally flexible. Transverse myelitis from other causes can be excluded on its rarity at this age and the absence of loss of control of the sphincters and of disturbance of sensation. The lesion must, therefore, be in the brain. It is hard to conceive of a lesion anywhere in the brain which would cause a spastic paraplegia without other symptoms, except in the cortex. A lesion of the cortex in the region of the upper portion of the post-central convolution on both sides of the longitudinal fissure would cause just such a combination. Such a lesion in an infant is usually a congenital defect or the result of a subdural hemorrhage at birth. The long, hard labor, which is the usual cause of such hemorrhages at birth, and her feeble condition after birth, make it almost certain that in this instance the lesion is due to a hemorrhage at birth. The diagnosis of CEREBRAL PARALYSIS resulting from a subdural hemorrhage at birth is, therefore, justified.

Prognosis. There will be no extension of the paralysis and her mental development will be normal. There will be no spontaneous improvement in the condition of the legs. Much improvement in her walking can be expected, however, from suitable operations and apparatus.

Treatment. Electricity and massage are useless in this condition because there is no disturbance of the nutrition of the muscles. It is probable that passive motions, if thoroughly carried out, will prevent further contractures, but it is very doubtful if they will diminish those now present. Proper operative procedures, perhaps followed by the application of apparatus, ought to improve the position of her legs and make walking much easier. Resection of the posterior nerve roots, recently recommended for the relief of this condition, has not as yet been tried out thoroughly enough to justify its use, except as a last resort. She should be placed in the hands of an orthopedic surgeon for treatment.

CASE 91. Robert K., two and three-fourths years old, was the child of healthy parents. One brother was alive and well, another had died at birth. There had been no miscarriages. There was no tuberculosis in the family and there had been no known exposure to tuberculosis. He was born at full term after a normal labor and was normal at birth. He was nursed for eleven months. He had always been well, except for measles a year before and frequent colds with bronchitis.

He fell down stairs, striking his head, early in the morning of August 3. He was apparently not hurt and appeared well all day. He began to vomit during the morning of August 4 and continued to vomit, at intervals of about an hour, until 3 A.M., August 5. He did not vomit again. There had been no known indiscretion in diet and the bowels were open. He was delirious in the early morning. He was admitted to the Children's Hospital at 2 P.M., August 5.

Physical Examination. He was well developed and nourished and of good color. He was restless and irrational but, when roused, noticed a little. There was no rigidity of the neck and no neck sign. The pupils were equal and reacted to light. The tongue was fairly clean. The throat, heart, lungs and abdomen were normal. The liver and spleen were not palpable. There was no spasm or paralysis. The knee-jerks were equal and normal. Kernig's and Babinski's signs were absent. There was no ankle clonus. The rectal temperature was 99.8° F., the pulse 120, the respiration 36.

The urine was light yellow in color, clear, acid in reaction and contained no albumin, sugar or acetone. The sediment contained a few epithelial cells and crystals of uric acid.

The fluid obtained by lumbar puncture was under considerable pressure. It ran clear at first, but the last of it was somewhat bloodstained. No fibrin clot formed in twenty-four hours. It contained 360 cells to the cubic millimeter, a part of which were undoubtedly due to the admixture of blood. The differential count of these cells, which showed 90% of mononuclear to 10% of polynuclear, shows that only a few of them came from the blood, because, if many of them had come from the blood, the number of polynuclear

cells would have at least equaled that of the mononuclear. No tubercle bacilli or other organisms were seen on a routine examination, and cultures were sterile.

He passed a very restless night and at times was quite noisy, requiring morphia to keep him quiet. He was quiet

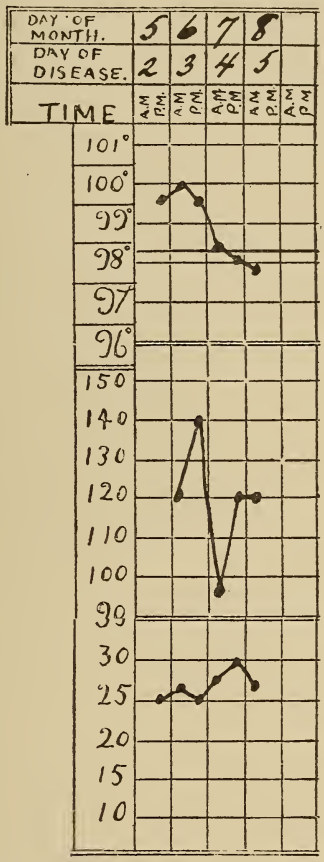

FIG. 10. CHART OF ROBERT K. CASE 91.

and drowsy the morning of August 6. There was no rigidity of the neck or neck sign. The pupils were equal and reacted to light. The knee-jerks were equal and lively, the abdominal and cremasteric reflexes normal. There was no Kernig's sign and no ankle clonus.

He was quiet August 7. There was slight rigidity of the neck. The pupils were equal and reacted to light. The

knee-jerks were present and equal, but sluggish. There was a suggestion of Kernig's sign on the left but none on the right. Babinski's phenomenon was absent.

He recognized and spoke to his parents and remembered the names of friends and relatives August 8. He noticed more and was afraid of the light used to test the reaction of the pupils. They were equal and reacted to light. There was no rigidity of the neck, and no neck sign. There was no spasm or paralysis. The knee-jerks were equal and normal. The abdominal and cremasteric reflexes were not obtained. Kernig's and Babinski's signs were absent. Sensation to touch and pain was normal.

The white blood count was 10,100.

Another lumbar puncture was done. The fluid was clear and contained 480 cells to the cubic millimeter, 97% of which were small mononuclear. Many of the cells were degenerated. No organisms were seen in a routine examination, and cultures were sterile.

He was seen at 10 A.M., August 8.

Diagnosis. The positive findings in the cerebrospinal fluid show that the trouble is located in the central nervous system (see Case 38 for description of the normal cerebrospinal fluid and of the fluid in meningitis). They exclude all forms of meningitis except the tubercular, but are also consistent with acute poliomyelo-encephalitis, in the acute stage of which the cerebrospinal fluid contains a considerable excess of cells, largely small mononuclear. The diagnosis lies, therefore, between tubercular meningitis and acute poliomyelo-encephalitis. If it is poliomyelo-encephalitis, the stress of the disease has fallen in this instance, of course, on the cerebrum, and it can be spoken of as an encephalitis.

The absence of a family history of, or of exposure to, tuberculosis does not rule out tubercular meningitis; the history of an attack of measles in the past is a small point in its favor. The acuteness of the onset is somewhat in favor of encephalitis, but is not inconsistent with tubercular meningitis. The fall was probably purely a coincidence, but, in any case, is of no assistance in differential diagnosis as it might predispose to the development of either condi-

tion. There is nothing about the symptomatology which is inconsistent with either condition, although the absence of the neck sign and the slightness of the changes in the reflexes and of the rigidity of the neck are somewhat against tubercular meningitis. The improvement in the symptoms and the drop in the temperature, while they suggest the beginning of convalescence from encephalitis, do not by any means exclude tubercular meningitis, because remissions are characteristic of this disease. The absence of leucocytosis is common to both diseases. The absence of a fibrin clot in the cerebrospinal fluid counts against tubercular meningitis; the absence of tubercle bacilli does not, because they are not found in more than ten per cent of the cases, if the examination is merely a routine one. A positive diagnosis is, therefore, impossible. The weight of the evidence, is, however, somewhat in favor of ENCEPHALITIS, sufficiently so to justify it as a provisional diagnosis. Time alone can decide whether or not it is correct.

Prognosis. If the diagnosis of encephalitis is correct, the prognosis is very good. He will almost certainly recover entirely and be left without sequelæ, either mental or physical.

Treatment. The treatment can only be symptomatic. Nothing can be done in any way to modify the course of the encephalitis.

CASE 92. Fred C., seven and one-half years old, had always been well except for measles and whooping-cough some years before. He had been spending the summer in a locality within twenty miles of which there had been several cases of infantile paralysis during the past few weeks.

He complained of headache the afternoon of September 7. He vomited and was somewhat feverish the next morning, but went in bathing that noon as usual. He complained in the evening that his throat felt a little full. He was given a laxative that night and had a good movement the morning of the 9th. He was brought home that day by train, a journey of about one hundred and twenty-five miles. He took a little milk and ate several crackers on the way. He walked out of the station to his automobile without difficulty. He undressed himself and ate a little supper, although he complained that it was hard for him to swallow. He was seen by his physician in the early evening. The physical examination, including the throat, showing nothing abnormal. His mouth temperature was 103° F., his pulse 115, and rather feeble. He collapsed about midnight and was seen again soon after by his physician. He was then slightly cyanotic. His pulse was very feeble and his respiration rapid. He was unable to swallow anything, not even his saliva. He was given an enema of hot milk and brandy and soon rallied. His color continued bad and his respiration rapid, however, and he was unable to swallow. He was seen in consultation at 7.30 A.M., September 10.

Physical Examination. He was well developed and nourished and perfectly clear mentally. His face and extremities were a little dusky. There was no rigidity of the neck. He could move his head, but could not turn himself in bed. The pupils were equal and reacted to light. There was no paralysis of the eye muscles and no facial paralysis. His respiration was rapid but not noisy. He was coughing constantly but feebly, and was all the time trying, but usually unsuccessfully, to spit up bloody, frothy mucus. He could stick out his tongue. There was no paralysis of the soft palate. The throat was normal to inspection and palpation. He could speak a word or two at a time

distinctly. Respiration was entirely diaphragmatic. There was no movement of the chest wall, and the accessory muscles of respiration were not acting. There was no retraction of the suprasternal, supraclavicular or intercostal spaces. The respiratory sound was feeble, alike on both sides and normal in character. No râles were heard in front; the backs were not examined. The cardiac area was normal, the action a little irregular, the rate 124, the first sound of fair strength, and there were no murmurs. The abdomen was normal. The liver and spleen were not palpable. He could move his arms, but the movements were feeble. The abdominal and cremasteric reflexes were present. The legs were not examined.

Diagnosis. The normal condition of the throat, the clear voice, the quiet respiration and the absence of retraction rule out all forms of obstruction of the air passages. There is no disease of the lungs which causes bilateral immobility of the chest. Edema of the lungs from cardiac failure is suggested by the bloody, frothy expectoration, but is excluded by the normal size and fair strength of the heart and the absence of râles. The only possible explanation of the symptoms is paralysis of the muscles of respiration. This explanation is justified by the physical examination. There is also a paresis of the muscles of the arms and trunk. The difficulty in deglutition and the irregularity of the pulse make it probable that the pneumogastric nerve is also involved. The only disease of the nervous system which will explain the sudden appearance of this combination of symptoms is acute poliomyelo-encephalitis, commonly known as Infantile Paralysis.

Prognosis. The prognosis is absolutely hopeless. He will probably live but a few hours.

Treatment. There is no treatment which can do more than perhaps delay the fatal outcome a few hours. Oxygen must be given freely. Strychnia and caffein-sodium benzoate or salicylate may be given subcutaneously. The administration of morphia subcutaneously is justifiable, if he is very uncomfortable.

CASE 93. John P., three years old, was the child of healthy parents and had always been well and strong. He had had a slight disturbance of the digestion August 20, which had yielded promptly to catharsis and regulation of the diet. He was restless and a little feverish during the evening of August 28, was given a large dose of castor oil by his mother and had several large, well-digested movements from it. It was discovered the next morning that he could not use his legs properly. He could move them in all directions, but the movements were feeble. The rectal temperature that morning was 101° F. There was no increase in the weakness of the legs during the day and he slept all that night. The loss of power was much more marked, however, the morning of the 30th. He complained of pain in his feet for the first time that morning. There was no disturbance of defecation or micturition. He had had no other symptoms. He was seen in consultation August 30 at 10.30 A.M.

Physical Examination. He was well developed and nourished and of good color. He was perfectly clear mentally. There was no paralysis of any of the muscles controlled by the cranial nerves. The tongue was slightly coated; the throat was normal. The heart, lungs and abdomen were normal. The liver and spleen were not palpable. He used his arms freely. He held up his head well. He could sit alone, but rather feebly, the feebleness being due to the insufficiency of his legs. There was no deformity of the spine, which was normally flexible. The only motion which he could make with his legs was to flex the left toes a little. When the thighs were flexed on the body he could hold the left one there for an instant; the right dropped outward at once. The bones and joints were normal. Passive motions were not limited or painful. The abdominal and cremasteric reflexes were normal. The knee-jerks were absent on both sides. Kernig's and Babinski's signs were absent. Sensation to touch and pain was normal. There was no enlargement of the peripheral lymph nodes. The rectal temperature was 99° F.

Diagnosis. The history and physical examination exclude

at once, of course, injuries and diseases of the bones and joints. Rheumatism is not accompanied by flaccid paralysis. The paralysis must be due, therefore, to some disease of the nervous system. The absence of all symptoms of meningeal irritation, the clear mind, the paraplegic distribution of the paralysis and the absence of the knee-jerks exclude disease of the brain. The sudden onset and the absence of disturbances of sensation rule out disease of the peripheral nerves. The lesion must, therefore, be located in the spinal cord. The combination of loss of power and reflexes without disturbance of sensation occurs only in lesions of the anterior horns. Such lesions develop acutely in childhood only in the disease known as INFANTILE PARALYSIS. This is, therefore, the diagnosis.

Prognosis. The chance of the extension of the process upward and of involvement of the respiratory muscles is so slight that a positively favorable prognosis as to life is allowable. There will, in fact, in all probability be no further extension of the paralysis. The paralysis is certain to improve a great deal. It is impossible to state now how great the improvement will be. He may recover entirely, but will in all probability be left with considerable disability in the right leg and a little in the left. There will be little improvement after the first six months.

Treatment. Nothing whatever can be done to modify the pathological process in the nervous system. There are no drugs which can possibly do any good, since the harm is already done. It is unreasonable to expect external applications to have any effect on the spinal cord, which is located inside the vertebral column and has an entirely different blood supply from the superficial tissues. The only thing that they can do is to disturb the patient. While nothing can be done to shorten the course of the disease or to limit its progress, there is no doubt that the use or the attempted use of the extremities involved tends, during the acute stage, to delay the process of repair in the nervous system and possibly, very early, to favor the extension of the process. He should, therefore, be kept as quiet as possible for six weeks, when the acute stage is presumably over. If he has much pain, he

should be kept quiet for three weeks after the cessation of the pain. Massage and electricity have the same action as the use of the extremities and should not, therefore, be begun for six weeks. It is very important during this period, however, to prevent the development of contractures, which make the subsequent treatment much more difficult. The weight of the bedclothes must be kept off of his legs by a cradle. A light wire splint will prevent extension of the feet and flexion of the knees. Strychnia is a stimulant to the motor nerves and is, therefore, contra-indicated during the acute stage. Hexamethylenamine cannot be expected to do any good now, since the harm is already done. It is possible, however, that it may destroy or inhibit the growth of the micro-organisms which cause the disease and prevent them from escaping from the body and causing the disease in others. It will be well, therefore, to give him three grains of hexamethylenamine three times daily. It goes without saying, of course, that he must have good food and plenty of it, a liberal amount of fresh air and sunlight and good care in general.

After the expiration of the acute stage he can begin to try to use his legs, must have vigorous and active treatment by electricity and massage and will be helped by strychnia. Treatment is most effectual during the first six months. Little improvement can be expected after this time, except from muscle training. It is extremely important, therefore, to give him every attention during this time and not to put off treatment until some future period.

CASE 94. Joseph R., four years old, was the child of healthy parents. Five other children were well and there had been no deaths or miscarriages. There had been no known exposure to tuberculosis.

He was born at full term after a normal labor, was normal at birth and weighed ten pounds. He was nursed for ten months and did very well. He had otitis media, followed by mastoid inflammation and operation, when he was one and one-half years old, but made a perfect recovery. He had measles when three and one-half years old and mumps a few months later, but had otherwise been well and strong. He was said to have had pneumonia, lasting eight or nine days, in the early part of December, but was not very sick, and had no marked cerebral symptoms. Soon after getting up from the " pneumonia " he began to stagger a little, " as if drunk." The staggering increased rather rapidly in severity for a time and then remained unchanged. He also began to complain of occipital headache at about the same time. The headache was, however, never very severe, was not continuous and did not prevent him from sleeping. He began to vomit about Christmas and had continued to do so. The vomiting had no apparent relation to food. There were no other signs of indigestion, his appetite was good and his bowels moved regularly. He sometimes vomited with great force. He was bright and happy when his head did not ache, and played as much as his unsteady gait would permit. He had no trouble with sight or hearing and his memory was good. He was seen January 28.

Physical Examination. He was fairly developed and nourished and of good color. His skin was rather dry. He was perfectly clear mentally. There was no tenderness on percussion of the skull. Macewen's sign was absent. There was no rigidity of the neck. He both saw and heard. The eardrums were normal. The pupils were equal and reacted to light. The right eye showed an optic neuritis of the choked-disk type with a fair amount of swelling; the left eye showed similar but less marked changes. There was no spasm or paralysis of any of the muscles controlled by the cranial nerves. He held his head up straight and sat up straight.

His tongue was clean and the mouth and throat normal. The heart, lungs and abdomen were normal. The liver and spleen were not palpable. He used his hands normally. He walked a little unsteadily and, on turning, staggered and almost fell. There was no tendency to fall to one side more than to the other. There was no spasm of the legs, and when lying down he could make all motions without difficulty. The knee-jerks were equal and normal. Kernig's and Babinski's signs were absent. The cremasteric and abdominal reflexes were normal. Sensation to touch and pain was normal by rough tests. The genitals were normal. There was no eruption and there were no scars of old eruptions. There was no enlargement of the peripheral lymph nodes. The mouth temperature was 98.6° F., the pulse 96, the respiration 24.

The urine showed nothing abnormal.

The white corpuscles numbered 8,000.

A tuberculin skin test was negative.

Diagnosis. The persistent vomiting without other symptoms of indigestion, the projectile character of the vomiting, the occipital headache without disturbance of digestion, disease of the kidney or eyestrain, and the staggering gait without disease of the ears form a combination of symptoms that can be explained only by some trouble in the brain. The optic neuritis proves that there is a cerebral lesion. The condition is, of course, a chronic one. The first possibility which suggests itself is an abscess of the brain resulting from the otitis media two and one-half years before. Cerebral abscess is very rare at this age and a latent period of two and one-half years without any symptoms is most unusual. These facts, together with the normal condition of the ears and the absence of fever and leucocytosis, make an abscess extremely improbable. Another possibility is that the illness which was called pneumonia was, in spite of the lack of nervous symptoms, an encephalitis and that the present symptoms are the result of it. It would be hardly possible, however, for an encephalitis to be mistaken for a pneumonia, although a pneumonia might easily be mistaken for an encephalitis. The lesions caused by an encephalitis would not be likely to cause an optic neuritis and would almost certainly produce

some spasm, paralysis, change in the reflexes or mental disturbance. The most reasonable explanation for his symptoms is a rather rapidly growing cerebral tumor. The optic neuritis, projectile vomiting and staggering all point to it. The absence of Macewen's sign does not count much against the presence of a tumor, because it is often hard to elicit and is often absent when the tumor is deep seated. The location of the pain in the occiput and the reeling gait make it probable that the TUMOR is in the CEREBELLUM. The absence of spasm, paralysis and changes in the reflexes is negative evidence in favor of this location. Nearly forty per cent of cerebral tumors in childhood are, moreover, in the cerebellum.

It is impossible to more than guess at the nature of the tumor. The negative tuberculin test practically rules out a solitary tubercle, although about fifty per cent of the cerebral tumors in childhood are tubercular. Gumma is extremely rare at this age, the family history is good, there is nothing in his past history to suggest syphilis, and the physical examination shows no sign of syphilis in the past or at present. A gumma can, therefore, be excluded. The chances lie between a glioma and a sarcoma, the former being somewhat the more probable as gliomata are more common than sarcomata at this age.

Prognosis. The prognosis is hopeless. He will probably not live more than three or four months, perhaps not as long.

Treatment. The treatment can be only symptomatic and for comfort. He must not be allowed to suffer pain when morphia will relieve him. It will be well, perhaps, to give him iodide of potash up to the physiological limit on the possibility that the tumor may be a gumma. It will probably do no good, but can do no harm. The chances of the successful removal of the tumor by an operation are practically nil. It will be only fair, however, to state the facts to the parents and allow them to decide as to whether or not they wish an operation. A lumbar puncture should not be done because it is very likely to cause sudden death when there is a cerebral tumor, especially if it is located in the cerebellum.

CASE 95. Ambrose M., nine years old, had a sore throat the last week in March. He was not sick enough to be in bed and no physician was called. He returned to school after a week. His voice became somewhat unnatural about April 25, and several days later liquids began to come through his nose when he drank. He found, May 1, that he could not see the blackboard very well, and a few days later began to have some difficulty in walking steadily. These symptoms were all present when he was seen, May 6.

Physical Examination. He was well developed and nourished, but rather pale. His tongue was clean and was protruded in the median line. The gums were healthy. His throat was normal, except that the soft palate moved but little when he spoke. His voice was somewhat hoarse. There was moderate internal strabismus on the right. The pupils were equal and reacted to both light and accommodation. The heart, lungs and abdomen were normal. The liver and spleen were not palpable. He moved his arms freely and his grip was strong. He moved his legs freely but with little muscular power. He walked a little unsteadily. His legs felt flabby and were rather cool. The knee-jerks were absent on both sides. The abdominal and cremasteric reflexes were somewhat diminished. Kernig's and Babinski's signs were absent. Sensation to touch was somewhat blunted, but that to pain and temperature was normal. There was no tenderness anywhere. There was no enlargement of the peripheral lymph nodes.

The urine was normal in color, acid in reaction and of a specific gravity of 1,018. It contained neither albumin nor sugar.

Diagnosis. The paresis of the legs in combination with the loss of the knee-jerks suggests to a certain extent infantile paralysis. A slow onset and a paraplegic distribution of the paralysis are, however, uncommon in infantile paralysis. The disturbance of sensation shows that the lesion is in the peripheral nerves, not in the anterior horns. The paresis of the soft palate and of the right external rectus is, moreover, not consistent with infantile paralysis, because, even with our present conception of the pathology of this disease, it would

be hard to conceive of a poliomyelo-encephalitis resulting in paresis of the legs, one muscle of one eye and the soft palate and nothing else. The only possible explanation of this combination in a child of nine is a peripheral paralysis.

This combination is almost pathognomonic of diphtheritic paralysis. The absence of pain and tenderness is also very characteristic. The history of a sore throat a few weeks before the onset of the paralysis makes the diagnosis of DIPHTHERITIC PARALYSIS positive. The only other form of peripheral paralysis at all likely to occur in childhood, that due to lead poisoning, can be excluded, not only because of the typical picture of diphtheritic paralysis which this boy presents, but also on the distribution of the paralysis and the absence of pain and tenderness and of a lead line on the gums.

Prognosis. The prognosis is good. He will probably recover from the paresis of the eye and throat in six or eight weeks. The legs will probably not be well for from four to six months. The reflexes will not return until some time later.

Treatment. He must not use his eyes for near work. It will be easier for him to take solid or semi-solid than liquid food. He must be kept reasonably quiet. Exercise, except in moderation, retards rather than hastens recovery. Care must be taken to prevent, by the use of passive motions or apparatus, the development of contractures. Massage and electricity must be begun at once. Faradism is preferable, if the muscles react to it; if they do not, galvanism must be used. It must be remembered in this connection that the object of both massage and electricity is merely to keep the muscles in good condition until the nerves resume their function, and that they have no direct curative action on the nerves. He should be given strychnia in doses of from one-sixtieth to one-thirtieth of a grain, three times daily, after eating.

CASE 96. Elizabeth C., three years old, was the only child of extremely neurotic but healthy parents. There had been no miscarriages. She had always been well.

Her mother left her with an attendant one afternoon. She was pulled up from the floor by the arms a number of times and had also swung on a gate with her arms extended. She had had no fall. She complained a little of pain in her left arm before she went to bed, but nothing was thought of it. No one could tell whether she used her arm or not during the late afternoon before she went to bed. She slept well all night, seemed perfectly well in the morning and ate a good breakfast, but did not use her left arm at all. She apparently had no pain in it. She was seen at 2 P.M.

Physical Examination. She was well developed and nourished and of good color. She was very bright and much interested in her surroundings. There was no rigidity of the neck and no paralysis of any of the muscles controlled by the cranial nerves. She had twenty teeth. Her tongue was clean; her gums, mouth and throat were normal. There was a slight rosary. The heart and lungs were normal. The abdomen was rather large and lax, but otherwise normal. The liver and spleen were not palpable. Her left arm hung limply by her side with the palm turned backward and the fingers partially flexed. She would not reach out for or take hold of anything. There was no tenderness about the joints or bones or along the nerve trunks. There were no evidences of fracture or dislocation. There was no swelling or redness. Passive motions were not limited or painful. There was apparently no disturbance of the sensations to touch or pain. The reflexes of the arms were normal. She used her right arm and legs freely. The knee-jerks were equal and normal. Kernig's and Babinski's signs were absent. She was slightly knock-kneed, but there was no enlargement of the epiphyses at the wrists and ankles. There was no enlargement of the peripheral lymph nodes. There were no mucous patches and no eruption or signs of old eruptions. The rectal temperature was 98.6° F.

Diagnosis. Scurvy, while a possibility, is very improbable in a child of three on a general diet. It can be excluded on

the localization of the symptoms in one extremity, the absence of pain on passive motion and the absence of swelling and tenderness. Syphilitic periosteitis can be ruled out on the good family and past history, the absence of signs of syphilis in the past or present, the absence of local tenderness and swelling, and the localization in one extremity. Acute periosteitis or osteomyelitis can be excluded on the good general condition and the absence of fever, pain and tenderness. The history of fleeting pain is like that of rheumatism at this age. Children do not stop using their extremities when they have rheumatism, however, and the pain is usually more general. The onset and development of the paralysis, although unusual, are not inconsistent with infantile paralysis, but the absence of fever and the retention of the reflexes practically exclude it. The position of the arm suggests that there may have been some pressure on the brachial plexus. It is hard to see how this could have happened in her case, and the absence of disturbances of sensation makes it very improbable. There is no dislocation or evidence of injury to the arm at present. It is very possible, however, that there may have been a partial dislocation of the shoulder as the result of the pulling up by the arms or of the swinging, with immediate spontaneous reduction. The subconscious memory of the pain caused by motion of the arm at that time may account for the failure to use it now. This seems, at any rate, the most plausible explanation. In an older child or adult it would be called an HYSTERICAL PARALYSIS.

Prognosis. The prognosis is perfectly good. If she can be sufficiently interested in some game or toy to forget herself entirely, she will use the arm at once.

Treatment. The treatment consists in getting her mind entirely off of herself so that she will unconsciously use the arm again.

SECTION XII.

UNCLASSIFIED DISEASES.

CASE 97. Sadie H. was the first child of healthy parents. There had been no miscarriages. Her parents were Russians and not related. There was no history of idiocy or nervous diseases in either family.

She was born at full term after a normal labor, and seemed normal at birth. She was nursed for ten months, after which she was given a general diet. Her appetite and digestion had always been good. Constipation began when she was two months old and had persisted. A dry and scaly condition of the face, scalp and extremities developed when she was three months old and had resisted all forms of treatment. She had rather more hair than most children at birth, but this soon dropped out and no more appeared until she was nearly two years old. Her mother noticed when she was six months old that her tongue seemed too large for her mouth and that she drooled more than most babies. When she was eight months old her mother noticed that she was not as bright as other children of her age. Her mental development had, as time went on, dropped progressively farther behind that of other children of her own age. She was seen when three and one-fourth years old, and could then say only a few words. Her parents thought, however, that she understood much of what was said to her. She had not learned to control her sphincters. She cut her first tooth when she was two years old and began to sit up a little when she was two and one-fourth years old. She had not learned to creep or stand. Her large tongue made swallowing difficult and she drooled constantly.

Physical Examination. She took considerable interest in her surroundings, but made no attempt to play with the toys offered to her, although she held them in her hands for a time. She knew her parents and said "Papa" and

"Mamma" and a few other simple words. She was small but fairly nourished. Her skin had a peculiar yellowish pallor. She had considerable rather coarse hair. The face and the top of the head were covered with a dry, scaly eruption. The anterior fontanelle was closed. The head was of good shape, except that it was somewhat flattened on top. The bridge of the nose was flattened and the nostrils wide. The lower lids were rather full. She kept her mouth open and drooled constantly. The thickened and broadened tongue protruded just beyond the lips. She had six incisor teeth which, although only just through the gums, were much blackened. The throat was normal. Her voice was hoarse and deep. The rings of the trachea were distinctly palpable. The neck was not especially short, and there were no supraclavicular pads. She held up her head well but sat up rather feebly, with a marked general kyphosis. This was replaced by a slight lordosis in the lumbar region when she was held upright. There was a moderate rosary and a little flaring of the lower ribs. The heart and lungs were normal. The level of the abdomen was much above that of the thorax, but nothing else abnormal was detected in it. The lower border of the liver was palpable just below the costal border in the nipple line. The spleen was not palpable. The lower legs and feet appeared puffy but did not pit on pressure. The soles of the feet were flat, like those of an infant. The forearms and hands were also puffy, especially in the palms. The hands and feet were cold and the skin of the legs, feet, arms and hands dry, and in places scaly. There was no enlargement of the epiphyses, but the long bones of the extremities seemed larger in circumference than normal. The distance from the anterior superior spine to the sole of the foot was forty-four per cent of the body length, while it should be about fifty per cent. There was no spasm or paralysis. The knee-jerks were equal and diminished. Kernig's sign was absent. The external genitals were normal. There was a slight general enlargement of the peripheral lymph nodes. The rectal temperature was 98° F. She weighed twenty-two and one-half pounds (average is thirty-four and one-half pounds).

Diagnosis. The history and physical examination of this child are so characteristic of SPORADIC CRETINISM that there is no opportunity for a differential diagnosis. The combination of retarded mental and physical development, yellowish pallor, coarse hair, dry and scaly skin, thickening of the skin of the extremities, broad nose, large tongue, hoarse and deep voice, apparent absence of the thyroid gland, short legs, thickening of the long bones of the extremities and subnormal temperature is pathognomonic of the disease. The flattening of the head, the rosary and the flaring of the lower ribs are undoubtedly signs of a complicating rickets. The delayed dentition, the kyphosis and the enlargement of the abdomen may be due to either, but more probably to the cretinism.

Prognosis. She will undoubtedly improve very materially, both mentally and physically, but too much must not be expected from the thyroid treatment when it is not begun until the patient is over three years old. The physical improvement will probably be much greater and more rapid than the mental. She will almost certainly, however, not attain normal stature, although her proportions will probably be approximately normal and she will be reasonably active. She will probably never develop sufficiently mentally to be a free agent or to support herself, although she will probably be able to do manual labor.

Treatment. The treatment is with some preparation of the thyroid gland. The best preparation is the dessicated extract. The initial dose for this child is one half a grain, three times a day. It must be increased, one quarter of a grain at a time, until toxic symptoms appear. These are nervousness, fever and diarrhea. The dose must then be put back to the largest one which did not cause toxic symptoms and kept there for many months. Later, it may be safe to give smaller doses. It is needless to say that she must continue to take thyroid extract as long as she lives. Her father's financial condition is poor. It will be wise, therefore, to place her in some institution for the care of the feeble-minded.

CASE 98. Lincoln F., fifteen months old, was the second child of healthy parents. There had been no deaths or miscarriages. He was born at full term after a normal labor, was normal at birth and weighed ten pounds. He was nursed for seven months and then given modified cow's milk prepared at home, on which he did very well. Oatmeal water was added to his milk when he was eleven months old, but had to be stopped because it caused hives. He was then put on whole milk and mutton broth. Barley water had recently been added to the milk. He had lost his appetite during the last month, but had had no nausea or vomiting. He had been having from four to five small, green, foul movements, containing small curds and mucus, daily. He had been fussy and had had some colic. He had lost nearly two pounds in weight.

Five days before he was seen all milk had been stopped and he had been put on beef juice, broth, white of egg and cereal jellies. He took his new food well and seemed better for three days, but had been very fussy the last two days, and had had five movements daily. These were loose, very dark in color and had a very foul odor. Swelling of the face appeared the day before, and that morning his hands and feet were also swollen. He was seen at 2 P.M.

Physical Examination. He was well developed and nourished, but rather flabby. His color was fair. The anterior fontanelle was nearly closed. His face was somewhat puffy, especially about the eyes. It was not reddened, but evidently itched. He had three teeth. The gums, mouth and throat were normal, the tongue moderately coated. There was no venous hum in the neck. There was a slight rosary. The heart, lungs and abdomen were normal. The liver was palpable 2 cm. below the costal border in the nipple line. The spleen was not palpable. The extremities were normal, except that the hands and feet were somewhat swollen. The swelling was not hot or red and did not pit on pressure. There was no spasm or paralysis. The knee-jerks were not obtained. Kernig's sign was absent. There was a slight general enlargement of the peripheral lymph nodes. The rectal temperature was normal.

The urine was high in color, turbid, very acid in reaction, of a specific gravity of 1,024, and contained no albumin or sugar. The sediment consisted of crystals of urate of ammonium.

BLOOD.

Hemoglobin,	65%
Red corpuscles,	5,240,000
White corpuscles,	12,000

Diagnosis. He undoubtedly has a chronic intestinal indigestion and a slight amount of rickets. The condition which requires explanation is the swelling of the face, hands and feet. The analysis of the urine shows that it cannot be due to disease of the kidney, the heart is normal and, while the blood shows a very slight degree of anemia, it is not sufficient to cause edema, and there is no venous hum in the neck. The swelling does not pit on pressure, moreover, and itches, showing that it is not an ordinary edema. It must, therefore, belong in the class of the ANGIONEUROTIC EDEMAS. These are in all probability due to some disturbance of the vasomotor control of the blood vessels. In this instance the edema is almost certainly connected in some way with the intestinal disturbance. It may be due either to irritation of the terminal sympathetic fibers in the walls of the intestines or to the absorption of toxic or chemical irritants from the intestines which act directly on the vascular terminal filaments of the sympathetic. It is, of course, impossible to say which. Its appearance at this time is probably connected with the change of food five days before, since no other element has been introduced. It cannot be due to the broth or jellies, because he has had broth and barley before without the appearance of edema. It must be due, therefore, to either the beef juice or the white of egg. The excessively foul odor of the stools suggests decomposition of the beef juice and the production of toxic substances, while white of egg is known to be the food which most often causes angioneurotic edema.

Prognosis. There is no danger connected with the angioneurotic edema. It is merely a side issue and does not alter the prognosis of the original intestinal indigestion.

Treatment. The first thing to do is to stop both the beef juice and white of egg, either or both of which may be the cause of the swelling. The next thing to do is to give him two teaspoonfuls of castor oil to empty the intestines of the toxic products of the decomposition of the beef juice and egg, which they probably contain. It will be well to stop his food for twenty-four hours, giving him in its place at least one quart of water. Alkalies seem to hasten the disappearance of angioneurotic edema. He should, therefore, be given about a dram of the citrate or acetate of potash or of bicarbonate of soda, in water, during the twenty-four hours. Equal parts of skimmed milk and barley water will be a suitable mixture with which to begin, after the day of water diet.

CASE 99. George R., two and one-half years old, was the child of healthy parents. There were four other children living and well, none had died and there had been no miscarriages. He had always been nervous but had had no illnesses. He had had nothing to eat the night before the onset of the present illness that had not been eaten by the rest of the family, but had been playing out in the snow that day and had got rather wet.

He had a number of attacks of rather severe abdominal pain, lasting from fifteen minutes to an hour, during the night of January 11. He had no other symptoms and appeared all right the next day. Both ankles became painful and swollen January 13, and purpuric spots appeared on the ankles and lower legs the next day. That day he had a very severe attack of abdominal pain, followed by vomiting and diarrhea which lasted for about twelve hours. Neither the vomitus nor the stools contained blood. He was seen January 15 by his physician, who found nothing abnormal on physical examination, except that both ankles were a little swollen and tender and had purpuric spots about them. The temperature was then 99° F. and the pulse 140. He continued to have attacks of severe abdominal pain, lasting from one hour to two hours, but had no other symptoms of indigestion and the bowels moved normally. Both abdominal and rectal examinations were normal on January 18. The urine showed nothing abnormal. The temperature had varied between normal and 99° F., the pulse between 120 and 150.

He did well from that time to January 24, when his scrotum and penis suddenly became much swollen, the scrotum being nearly three times its usual size and very painful. The swelling was pinkish in color and did not pit on pressure. It lasted but a few hours. Purpuric spots appeared on the buttocks at the same time. A similar swelling, the size of the palm of the hand, appeared over the sacrum the next day and disappeared again in a few hours. More purpuric spots also appeared on the buttocks. The attacks of abdominal pain recurred on the 27th. Between them he apparently felt perfectly well. He had no fever. He had been kept on a light diet from the beginning, but this included eggs and broth. He

was given citrate of potash at first and later three grains of the lactate of calcium daily. His bowels had been kept well open. He was seen in consultation January 28.

Physical Examination. He was well developed and nourished and of good color. His tongue was slightly coated, his teeth in good condition. His gums and throat were normal. His heart and lungs were normal. The abdomen was a little sunken and showed nothing abnormal. There were no masses, no tenderness and no muscular spasm. The liver and spleen were not palpable. The penis and scrotum were normal. The extremities were normal. There was no spasm or paralysis. The knee-jerks were equal and normal. There was no Kernig's sign. There was no enlargement of the peripheral lymph nodes. There were a few fading purpuric spots about the ankles and buttocks. A rectal examination showed nothing abnormal.

The urine was normal in color, clear, acid in reaction and of a specific gravity of 1,016. It contained neither albumin nor sugar. The centrifugalized sediment showed an excess of urates and an occasional small round cell, but no casts.

Diagnosis. The attacks of abdominal pain with the attendant vomiting and diarrhea, the swelling and the purpuric eruption about the ankles, and the swelling and purpuric eruption about the genitals and buttocks are undoubtedly merely different manifestations of some abnormal systemic condition. The swellings which appeared in the genitals and over the sacrum have all the characteristics of angioneurotic edema. The eruption on the buttocks deserves the name of purpura simplex. The swelling and eruption about the ankles is typical of purpura rheumatica. The attacks of abdominal pain would be very hard to explain if they occurred alone, but associated, as they are, with other manifestations of purpura, they are quite characteristic of the condition known as abdominal purpura or Henoch's disease. Giving these various symptoms names does not, however, bring us much nearer the diagnosis of the underlying condition. It does emphasize the fact, however, that it is not justifiable to describe the different forms of PURPURA as if they were different diseases, and shows that they are merely different

manifestations of the same condition. The association of the condition known as angioneurotic edema, which is presumably due to a disturbance of the nervous control of the walls of the blood vessels, with the purpuric condition makes it probable that the purpura is due to some toxic action on the vessel walls rather than to a bacterial infection. This assumption is supported by the absence of fever. The presence of the angioneurotic edema in association with the purpura also makes it probable that the purpuric condition is not due to any disturbance of the coagulability of the blood. There is nothing in the history or physical examination to suggest the origin of the toxic substance. The normal condition of the gums and the good health of the other members of the family rule out lead poisoning. The good health of the rest of the family and the absence of symptoms of indigestion make intestinal toxemia very improbable. The etiology must, therefore, remain unsettled. It is possible that the eggs and broth may have had something to do with the continuance of the condition, as they not infrequently cause angioneurotic edema. The attacks of abdominal pain may be due to an angioneurotic edema of the intestinal wall or to a hemorrhage into the wall. The short duration of the attacks and their frequent repetition, as well as the absence of blood in the stools, makes an edematous condition much more probable than a hemorrhagic.

Prognosis. There is no danger as to life unless, as sometimes happens, the local swelling in the intestinal wall causes an intussusception. The prognosis as to duration is, however, very indefinite as the condition not infrequently persists, with longer or shorter intermissions, for many weeks or even months.

Treatment. The etiology being so obscure, the treatment can only be along general lines. He must be protected from chilling and overexertion. His diet should be limited to milk and starches, as they are less likely to form toxic substances in the intestines than are the fats and proteids. He must be given plenty of water and his bowels kept well open, preferably with salines. Although the calcium salts have no special influence on the coagulability of the blood, they have seemed

clinically to be of some use in the treatment of angioneurotic edema and similar conditions. It will be well, therefore, to continue the lactate of calcium, but in larger doses, giving ten grains daily. Animal sera hardly seem indicated at present in this instance, because, if our reasoning is correct, the difficulty is not impaired coagulability of the blood. If the purpuric eruptions continue to recur, or if there are hemorrhages elsewhere, it will be wise, nevertheless, to give them a trial. (See Case 5.)

Heat externally and paregoric, in doses of fifteen or more drops, may be employed for the attacks of pain.

CASE 100. Charles W., eleven years old, was the child of healthy parents. One brother was living and well. There had been no deaths or miscarriages. His maternal grandfather had had diabetes, but had died of tuberculosis.

He was born at full term, was normal at birth and weighed six pounds. He had whooping-cough when one year old, mumps and chicken-pox when small, and measles at four years, but had otherwise been well. He had always eaten much candy and had craved sweet foods. He had passed much more urine during the last month than formerly, and had drunk large quantities of water. He had to get up several times at night to urinate and to allay his thirst. His appetite was large. He had had no itching of the skin and no eruption. He was admitted to the Children's Hospital, August 3.

Physical Examination. He was small and sparely nourished. He was moderately pale, but did not look or act sick. His skin was not dry or irritated, and there was no eruption. His tongue was slightly coated, the mouth and throat normal. The heart, lungs and abdomen were normal. The liver and spleen were not palpable. The extremities were normal. There was no spasm or paralysis. The knee-jerks were equal and lively. There was no disturbance of sensation. There was no enlargement of the peripheral lymph nodes. He weighed fifty-two pounds.

He was allowed to eat as much as he wanted of the regular hospital diet, but was not allowed to put sugar on his food. He passed 560 ccm. of urine (the normal average is 1,200 ccm.) August 4, of a specific gravity of 1,041, which contained 5.9% or 33.6 grams of sugar. It contained no albumin or acetone, and the sediment showed nothing abnormal.

An accurate account of what he ate was then kept. He took 85 grams of carbohydrates August 6 and passed 855 ccm. of urine of a specific gravity of 1,018, which contained 1.8% or 15.3 grams of sugar, but no acetone.

Diagnosis. There can be no doubt, of course, as to the diagnosis of DIABETES MELLITUS. A simple glycosuria can be excluded on the persistence of the symptoms and the presence of sugar in the urine when there is only a moderate amount of carbohydrates in the food.

Prognosis. There is practically no chance that he will recover, although, judging from the fact that he was able to make use of 70 grams of carbohydrates in twenty-four hours, the disease is not of a very severe type. His expectation of life is probably to be reckoned in months rather than in years, but he may, with careful treatment, live for a number of years. He is, however, very likely to suddenly develop acid intoxication at any time and die after a few days.

Treatment. Drugs are of no use in the treatment of diabetes. The treatment consists in regulation of the diet. The principles are simple. The diet must contain calories enough to supply the caloric needs. The carbohydrates must be cut down until the urine is free from sugar, but no lower than is necessary to accomplish this, because of the danger of the development of acid intoxication. If the acetone bodies appear in the urine when the carbohydrates are cut down, they must be increased again until the acetone bodies disappear. If the amount of the acetone bodies is small, it is safe for a time, however, not to increase the carbohydrates, but to neutralize the acetone bodies by giving bicarbonate of soda. The water should not be limited.

A boy of his size needs approximately 1,300 calories daily. It is a simple matter to lay out a diet for him which will contain the proper number of calories and to regulate the amount of carbohydrates which it contains by the use of the table of food values given in Case 73.

His diet August 13 was as follows:

	Calories.	Carbohydrates.
Cereal, 1½ oz. =	37.5	8.2 grams.
Rice, 1½ oz. =	67.5	15 grams.
Bread, 1 oz. =	75	15 grams.
Meat, 6½ oz. =	390	..
Eggs, 4 =	288	..
Butter, 3 oz. =	675	..
Tomato, 9 oz. =	...	..
	1,533	38.2 grams.

He passed 530 ccm. of urine of a specific gravity of 1,010, which contained neither sugar nor acetone.

The urine contained acetone the next day, however, although the amount of carbohydrates in the food was the same. The amount of carbohydrates was, therefore, gradually increased, so that on August 17 he was taking 76 grams. He passed on that day 470 ccm. of urine of a specific gravity of 1,026, which contained 2.3% or 10.8 grams of sugar, but no acetone.

It was evident, therefore, that his tolerance for carbohydrates lay somewhere between 38 grams and 76 grams. A little more experimenting showed that he could take about 55 grams of carbohydrates without the appearance of sugar in the urine, and that this amount prevented the formation of the acetone bodies. The diet and the examination of the urine on August 29 were as follows:

	Calories.	Carbohydrates.
Cereal, 1½ oz. =	37.5	8.2 grams.
Rice, 1½ oz. =	67.5	15 grams.
Bread, 2 oz. =	150	30 grams.
Meat, 5½ oz. =	330	..
Eggs, 4 =	288	..
Butter, 1½ oz. =	337.5	..
Broth, 6 oz. =	...	..
Cucumber, 4 oz. =	...	..
	1,210.5	53.2 grams.

He passed 650 ccm. of urine of a specific gravity of 1,016, which contained neither sugar nor acetone.

On this diet he held his weight and had no symptoms. This diet should, therefore, be continued. It is unnecessary to consider the use of any of the so-called "diabetic foods" when he can take as much carbohydrate as at present.

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